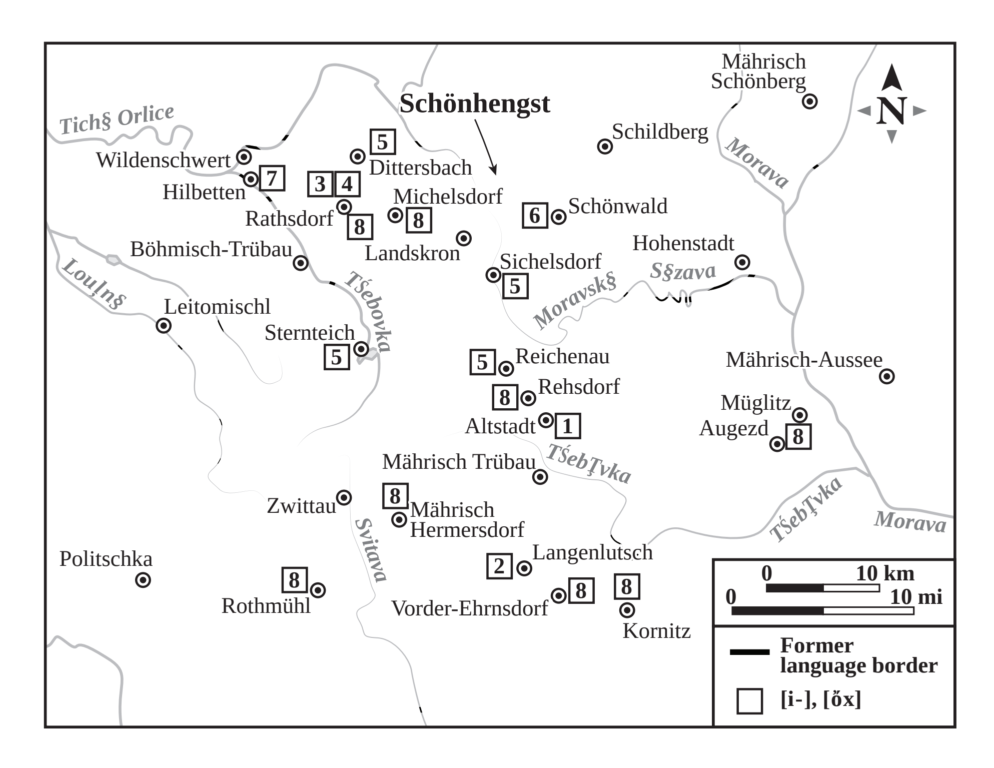


Map 15.2: Schönhengst. Squares indicate some version of postsonorant velar fronting. 1=Seemüller (1908b), 2=Janiczek (1911), 3=Graebisch (1915), 4=Matzke (1918), 5=Sandbach (1922), 6=Weiser (1937), 7=Appel (1963), 8=Benesch (1979).

c.	štɑrx	[ʃtɑrəx]	stark	'strong'	41
	furx	[fʊrəx]	Furche	'furrow'	41
	khirx	[kʰɪrəx]	Kirche	'church'	41

Janiczek is clear that velar [x] also surfaces after [r], which is realized as the tongue-tip trill (p. 6); see (5c). In his discussion of vowels in the context after /r/ plus labial or velar consonants (p. 41) Janiczek notes that there is a weak epenthetic vowel ("schwacher Sprossvokal") between the rhotic and velar. He transcribes that vowel in some (but not in all) examples as ⟦ᵉ⟧, which is his symbol for a short schwa ([ə]). Janiczek writes (p. 41) that the epenthetic vowel is present in the context between [r] and [x] even though he does not always include it in his phonetic transcriptions.

The data in (5) point to the common pattern whereby /x/ surfaces as palatal after any front vowel. The significance of Langenlutsch is that the epenthetic vowel

in (5c) is followed by velar [x] and not palatal [ç]. Recall from §5.4 that Schwa Epenthesis is very common among German dialects but that the overwhelming pattern is for the epenthetic vowel to be followed by the palatal fricative [ç]; see also §12.8.1. The palatal realization is a consequence of Schwa Fronting-2: /Vlx/⟶|Vləx|⟶|Vlə̟x|⟶[Vlə̟ç]. The data in (5c) can be accounted for straightforwardly if Schwa Epenthesis but not Schwa Fronting-2 is active: /Vlx/⟶[Vləx]. Langenlutsch is the only German dialect discovered in the present survey with an epenthetic vowel but without Schwa Fronting-2.

From the formal perspective, Velar Fronting-13 (=4) is active in Langenlutch. Given that the set of triggers consists solely of front vowels, there is no interaction between that process and Schwa Fronting-2.

Graebisch (1915) gives a phonetically transcribed text in the Rathsdorf dialect. Velars occur after back vowels (=6a), the vocalized-r (=6b), and palatals after front vowel (=6c).

(6) Dorsal fricatives in Rathsdorf (Schönhengst):

a.	nochpr̥	[noxpr̩]	Nachbar	‘neighbor’
	kǫchl	[kɔxl̩]	Küche	‘kitchen’
	rachen	[rɑxən]	rechnen	‘calculate-INF’
b.	kīəćh	[kiːəç]	Kirche	‘church’
c.	ićh	[iç]	ich	‘I’
	mećht	[meçt]	möchte	‘would like-1SG’

The interesting example is (6b), which indicates that r-Vocalization has applied (indicated as ⟦ə⟧) but not epenthesis (recall [kʰɪrəx] from 5c). The occurrence of the palatal fricative after the vocalized-r is common throughout many of the areas discussed in previous chapters (including StG). However, the realization of /x/ as [ç] after the vocalized-r is an anomaly in this particular region because other places in Schönhengst discussed below have [x] in that context. There are two options regarding the analysis of [ç] in (6b): (a) It is synchronically derived from /x/ on the basis of the /i/ preceding the vocalized-r (as in Lower Bavarian; §13.5.2), e.g. /kiːrx/⟶|kiːəx|⟶[kiːəç]; or (b) it is an underlying palatal /ç/, as in some of the dialects discussed in Chapter 7, as well as StG (Chapter 17). Option (a) can be shown to be correct if [x] but not [ç] were to surface after the vocalized-r when preceded by a back vowel. No such examples were found in Graebisch (1915). From the formal perspective both Velar Fronting-1 (=2) and Velar Fronting-13 (=4) are compatible with either (a) or (b).

Seemüller (1908b) presents phonetically transcribed texts for speakers from Altstadt. Some data from that work are listed in (7).

(7) Dorsal fricatives in Altstadt (Schönhengst):

a.	glaix	[glaiç]	gleich	‘soon’
	gəšixt	[gəʃiçt]	Geschichte	‘story’
	ʃlęxtɒ	[ʃlɛçtɐ]	schlechter	‘bad-INFL’
b.	khūχlęfl	[kʰuːxlɛfl̥]	Kochlöffel	‘wooden spoon’
	nuχ	[nux]	nach	‘after’
	toχtɒ	[toxtɐ]	Tochter	‘daughter’
	mǫχŋ	[mɔxŋ]	machen	‘do-INF’
c.	duɒχs	[duɐxs]	durchs	‘through the’

The items listed above show that the palatal (⟦x⟧) surfaces after a front vowel and the velar (⟦χ⟧) after a back vowel. Alstadt differs from Langenlutsch in that /r/ is vocalized in the former (=7c), after which [x] surfaces (cf. 6b from Rathsdorf). The occurrence of [x] after the vocalized-r has been discussed earlier (e.g. §3.5, §4.3, §13.5.2). In short, the data in (7) are consistent with either Velar Fronting-1 (=2), which is bled by r-Vocalization in (7c), or Velar Fronting-13 (=4), which does not interact with r-Vocalization.

Benesch (1979) is without a doubt the most valuable source for velar fronting in Schönhengst. The book is devoted to the historical phonology of vowels and consonants (with separate symbols for velars and palatals). What is more, Benesch compares the sound structure of multiple places within Schönhengst, thereby providing a valuable source for how a rule type (velar fronting) can differ from place to place in a small area.

It is clear from the data provided by Benesch that all of the places within Schönhengst he discusses have some version of velar fronting (Benesch 1979: 144–145). The basic generalization is unsurprising: [ç] (=⟦χ⟧) occurs after front vowels and [x] (=⟦x⟧) after back vowels. In the context after a consonant the predominant pattern is for [x] to surface after the coronal rhotic [r] throughout the area with the exception of Mährisch Hermersdorf, which has [ç]. Benesch (p. 144) writes “Nach r erscheint gewöhnlich x, nur H. (Z.G.) neigt in diesem Falle zur χ-Lautung”. (“After r usually only x occurs, but in [Mährisch] Hermersdorf (the Zwittauer region) it ([x]) tends to be pronounced in this context as χ”). In (8) I give a representative selection of data in Benesch’s transcription system with dorsal fricatives in the context after front vowels (=8a), back vowels (=8b), and [r] (=8c). The abbreviations in the six columns correspond to the six towns of Michelsdorf (Mi), Mährisch Hermersdorf (H.), Vorder-Ehrnsdorf (E.), Augezd (A.), Kornitz (K.), and Rehsdorf (Re.). Michelsdorf and Rehsdorf do not have dorsal fricatives after [r] because the latter sound is vocalized in coda position. As in Altstadt (=7c), /x/ surfaces as [x] after the vocalized-r in those two places, e.g. ⟦khīəx⟧ ‘church’.

(8) Dorsal fricatives in six places in Schönhengst:

		Mi.	H.	E.	A.	Ko.	Re.
a.	‘sting’	štīχ	štęiχ	štɑiχ	št$^{\bar{o}}$iχ	štīχ	štɑiχ
	‘cattle’	fīχ	fęiχ	fɑiχ	f$^{\ddot{o}}$īχ	fīχ	
	‘oak’	ɑiχ	oiχ	oɒiχ	ǫiχ		tɑiχ
	‘pond’	tɑiχ		tɑiχ	tɑiχ		tɑiχ
	‘bad’			šlęχt			šlęχt
	‘easy’	lɑeχt	lɑeχt	lęχt		lęχt	lęχt
	‘paint-PRET’	štrīχ	štręiχ	štrɑiχ	štrīχ		štrɑiχ
b.	‘weak’	šwǫx	šwōx	šwōx	šwǫx	šwōx	
	‘wick’	tọ̄xt	toxt	toxt	tōxt	toxt	toxt
	‘shoe’	šụ̄x	ši^{o}x	šaux	š^{o}ūx	šūx	šaux
	‘hose’	šlɑux				šlɑux	šlɑx
c.	‘church’		khiərχ	khiərx	khiərx	khiərx	
	‘through’		duɒrχ	duɒrx	duɒrx		
	‘lark’		lɑrx	lɑrx			

Benesch also provides a number of maps. The most important ones for present purposes are Maps 11 and 14. The former depicts the realizations of /rx/ in Schönhengst for the word ‘church’. Map 14 for *Köchin* ‘cook-FEM’ show that the palatal occurs after a front vowel ([i] or [e]) throughout Schönhengst.

The distribution of dorsal fricatives in the town of Rothmühl (Benesch 1979) differs from the distribution of those sounds in the other six places listed in (8). As indicated in (9), palatal [ç] is restricted to the context after a front unrounded vowel (=9b), while velar [x] occurs after a back vowel (=9a), [r] (=9d), or a front rounded vowel (=9c).

(9) Dorsal fricatives in Rothmühl (Schönhengst):

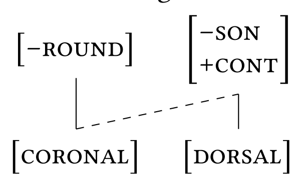
a.	hūx	[huːx]	hoch	‘high’	75
	wüox	[wyox]	Woche	‘week’	145
	rōx	[roːx]	Rauch	‘smoke’	145
	tǫxt	[tɔxt]	Docht	‘wick’	150
	braux	[braux]	Brauch	‘custom’	50
	liɒxt	[liɒxt]	Licht	‘light’	58
	rɑxt	[rɑxt]	recht	‘right’	16
b.	štīχ	[ʃtiːç]	Stich	‘sting’	25
	fīχ	[fiːç]	Vieh	‘cattle’	103

	štrīχ	[ʃtriːç]	strich	‘paint-PRET’	104
	rɑiχ	[rɑiç]	reich	‘rich’	106
	lɑeχt	[lɑeçt]	leicht	‘easy’	47
	reχtn̥	[reçtn̩]	richten	‘judge-INF’	144
c.	tǖx	[tyːx]	Tuch	‘towel’	62
	šǖx	[ʃyːx]	Schuh	‘shoe’	145
	gərǖx	[gəryːx]	Geruch	‘smell’	36
	zǖxŋ	[zyːxŋ̍]	suchen	‘seach-INF’	139
d.	khīərx	[kʰiːərx]	Kirche	‘church’	145
	düɒrx	[dyɒrx]	durch	‘through’	38, 89
	khwɑrx	[kʰwɑrx]	quer	‘across’	113

Front rounded vowels occur (as phonemes) throughout Schönhengst, but they are rare in the context before dorsal fricatives. ⟦ǖ⟧ (=[yː]) – historically [uo] – is the only front rounded vowel found before dorsal fricatives. Benesch describes that sound as equivalent to the long front rounded vowel [yː] in StG *früh* ‘early’ (p. 5). The change from [uo] to [yː] occurred throughout the Rothmühler Gebiet (Benesch 1979: 61); hence, the data in (9d) may hold for other towns in that area as well.

The data in (9) indicate that Rothmühl has a rule of velar fronting which applies to /x/ in the context after front unrounded vowels (=Trigger Type A’’ from Table 12.29). The restricted context is expressed below:

(10) Velar Fronting-12:

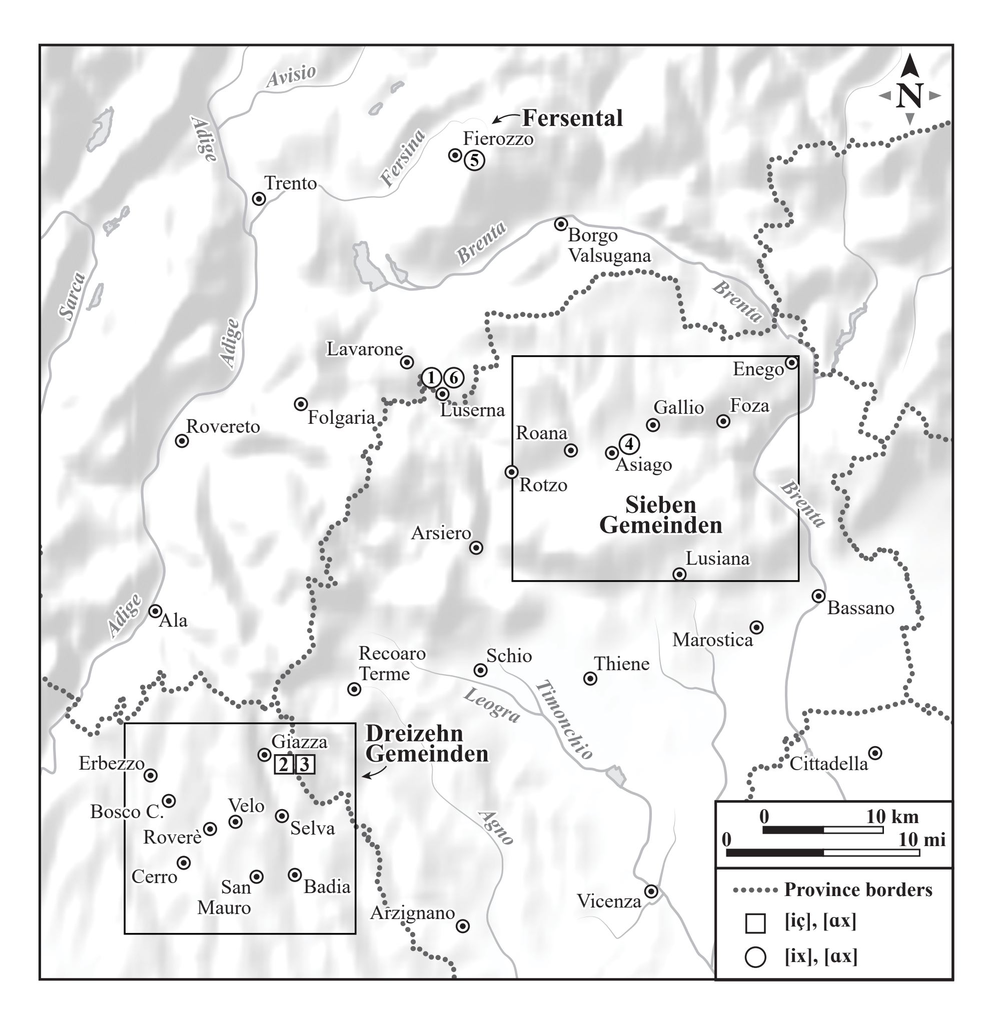


Recall from §12.6.1 that the restriction of velar fronting triggers to front unrounded vowels is a very rare pattern which is otherwise only attested in two LG dialects. The only other example of Trigger Type A’’ uncovered in the present survey is South Mecklenburg (Jacobs 1925a,b, 1926).

15.4 Giazza/Dreizehn Gemeinden

Several German-language islands are located in Northeast Italy (Map 15.3). Wiesinger (1983a: 906) identifies three Bav (Cimbrian) islands in that area: (a) Dreizehn

Gemeinden (Thirteen Communities) in the province of Verona, (b) Sieben Gemeinden (Seven Communities) in the province of Vicenza, and (c) the communities of Folgaria, Lavarone, and Lucerna in the province of Trentino. According to Wiesinger (1983a), (a–c) were settled by speakers of Bav dialects (Cimbrian) beginning in the twelfth century.



Map 15.3: Northeast Italy. Rectangles indicate the presence of some version of velar fronting (postsonorant and/or word-initial), and the circles show the absence of velar fronting. 1=Bacher (1905), 2=Schweizer (1939), 3=Mayer (1971), 4=Kranzmayer (1981), 5=Rowley (1986), 6=Tyroller (2003).

The sources for (b–c) indicate that there is no velar fronting, e.g. Luserna (Bacher 1905, Tyroller 2003), Sieben Gemeinden (Kranzmayer 1981). The UG dialect of Fersentalerich (Mòcheno) spoken in Fersental (Rowley 1986) is likewise characterized by the absence of velar fronting. Recall that §12.9.2 contained some remarks on coarticulatory fronting as described in Kranzmayer (1981) and Rowley (1986).

Two sources for the Giazza (including Dreizehn Gemeinden) in (a) above indicate that velar fronting is active. The first of those sources is Mayer (1971), whose speakers have both [x] and [ç]. Mayer proposes a treatment of those sounds cast in traditional phonemic theory, according to which [x] and [ç] derive from /x/. [h] is also included as an allophone of /x/ since it is restricted in its distribution to word-initial position before vowels, while [x] and [ç] only occur after a sonorant. As indicated below, [h] surfaces word-initially before vowels (=11a), while [x] occurs after a back vowel (=11b) and [ç] after a front vowel (=11c) or coronal sonorant consonant (=11d). The phonetic transcriptions in (11) are taken directly from Mayer (1971). The author is clear that [ç] surfaces after front vowels ("Vorder-Zungen-Vokale"), although [i] is the only example Mayer gives for a front vowel preceding [ç].

(11) Dorsal fricatives in Giazza/Dreizehn Gemeinden:

a.	[hurrt]	Hürde	'hurdle'	49
b.	[hǫax]	hoch	'high'	49
	[maxan]	machen	'do-INF'	49
	[foxlox]	Fuchsloch	'foxhole'	49
	[pruax]	Hose	'pants'	49
	[gəmaxt]	gemacht	'do-PART'	52
c.	[niçt]	nicht	'not'	52
	[siçela]	Sichel	'sickle'	49
d.	[khalç]	Kalk	'lime'	49
	[starç]	stark	'strong'	49

The data in (11) display the default pattern whereby velar fronting occurs after a coronal sonorant. That pattern is expressed formally with Velar Fronting-1 (=2).

A second source for velar fronting in Giazza (including Dreizehn Gemeinden) is one predating Mayer (1971) by over thirty years, namely Schweizer (1939). The latter work consists of a series of phonetically transcribed texts of varying length dealing with a wide variety of topics. The significance of those texts is that they can shed some light on the state of velar fronting in a German-language island

in the early part of the twentieth century because they distinguish [ç] (=⟦x⟧) and [x] (=⟦χ⟧). Brief remarks on the phonetics of those two sounds are made in the section on phonetic symbols on p. 11. In the list of consonants on that page, Schweizer also includes the affricate ⟦kχ⟧. Although he says nothing on p. 11 about its place of articulation, it is clear from the texts that both velar (⟦kχ⟧) and palatal (⟦kx⟧) affricates occur.

A comparison of the texts presented in Schweizer's work indicates that they were based on the speech of many different informants. It is possible to draw this conclusion because the distribution of the dorsal fricatives in any one text can be shown to be slightly different from the distribution of the same sounds in another text. Unfortunately, Schweizer does not indicate where his informants are from; hence, it is not possible to make a statement on the precise geography of velar fronting in the Cimbrian language islands of Northeast Italy (in the area in and around Giazza).[5]

I give a brief synopsis of the state of velar fronting in Schweizer (1939) by comparing the distribution of velars (⟦χ⟧=[x], ⟦kχ⟧=[kx]) and palatals (⟦x⟧=[ç], ⟦kx⟧=[kç]) in three of his texts. Many of those texts are only a few sentences long, while others consist of between one and two pages. I have selected below three longer texts in order to ensure that enough tokens are present to draw generalizations on the occurrence of the dorsal sounds in question. The velars and palatals in the statistics summarized in Table 15.1 include both fricatives and affricates. I consider the distribution of those sounds both word-initially and in postsonorant position. In both of those contexts I take into consideration the nature of the adjacent sound, where FV=front vowel, BV=back vowel, and CC=coronal sonorant consonant. There is no evidence that finer-grained distinctions are necessary, e.g. high front vowels vs. mid front vowels. The slash (/) indicates context, e.g. 'P/BV' for Table 15.1(a) means that the palatal is in word-initial position followed by a back vowel and for Table 15.1(b) that the palatal is situated after a back vowel. The number in each row in bold is the one that I interpret as an irregularity.

Consider first the word-initial context. Since palatals occur in a number of tokens even before a back vowel in Text 31, it is fairly clear that this pattern reflects nonassimilatory velar fronting. Examples in that context include ⟦kxôfft⟧ (=[kçɔfft]) 'buy-INF', ⟦kxuejer⟧ (=[kçuejer]) 'shepherd-PL (for cows)'. In Chap-

[5]The linguistic atlas for this region (ZFSA) – also authored by Bruno Schweizer – provides a number of maps for the German-language islands of Northeast Italy, including Sieben Gemeinden and Fersental. As noted by Stefan Rabanus in the recent (2012) commentary (ZFSA: 25), Schweizer's (1939) distinction between [x] and [ç] is not indicated on those maps. Rabanus opines in the commentary for Map 114 for *Furche* 'furrow' (p. 284) that Schweizer's ⟦x⟧ can be interpreted as [ç].

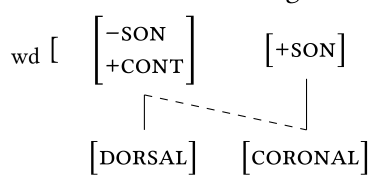
Table 15.1: Distribution of velars and palatals in three texts from Schweizer (1939). Wi.: Word-initial; Ps.: Postsonorant; P.: Palatal; V.: Velar.

	Text no.	P./BV	P./FV	P./CC	V./FV	V./BV	V./CC
a. Wi.	31	33	0	0	**1**	0	0
b. Ps.	31	4	5	5	0	**3**	0
c. Wi.	36	3	3	3	0	0	0
d. Ps.	36	**1**	11	0	0	5	0
e. Wi.	38	**2**	5	1	**2**	36	0
f. Ps.	38	0	24	2	**12**	20	**1**

ter 14 I showed that that type of pattern involved the restructuring of historical velars as underlying palatals and that there is therefore no synchronic rule, e.g. [kçuejer] is /kçuejer/. Word-initial velar fronting in Text 36 is assimilatory because palatals are surfacing only in the context before coronal sonorants. Text 38 likewise appears to illustrate assimilatory velar fronting in word-initial position, although there are four irregularities.

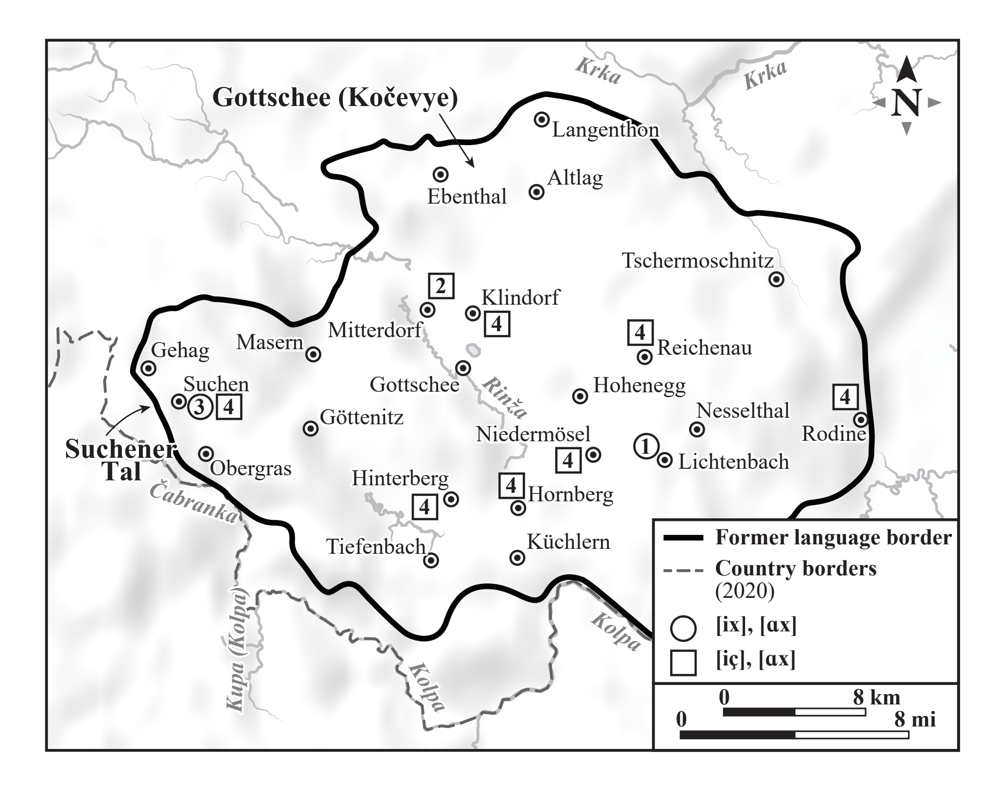
In postsonorant position velar fronting is nonassimilatory in Text 31 (with three irregularities) but assimilatory in Text 36 (with one irregularity). Two examples from Text 36 are ⟦kxnêxt⟧ (=[kçnɛçt]) 'vassal' and ⟦maχen⟧ (=[mɑxən]) 'do-INF'. Text 38 may also reflect the assimilatory pattern, although it is interesting that the speaker(s) on which the data are based have a larger number of irregularities (12). The assimilatory pattern described above is captured formally with Velar Fronting-1 (=2) or the mirror-image process for word-initial position, stated in (12):

(12) Wd-Initial Velar Fronting-8:



15.5 Gottschee

Gottschee was a German-language island in South Slovenia which corresponds roughly to the modern-day municipality of Kočevye (Map 15.4). The area was settled between 1325 and 1360 by speakers of SBav from Upper Carinthia (Oberkärnten) and East Tyrol (Osttirol; Wiesinger 1983a: 907–908).



Map 15.4: Gottschee. Places with velar fronting (postsonorant and/or word-initial) are indicated with squares and places without velar fronting with circles. 1=Tschinkel (1908), 2=Seemüller (1909b), 3=Wolf (1982), 4=Lipold (1984).

Several studies have investigated the sound structure of the German dialects of Gottschee. One of the earliest is Tschinkel (1908), who detected no velar fronting in the town of Lichtenbach (recall §12.9.2). A more recent work is Wolf (1982: 37), who is clear that there is no velar fronting in the area of Suchener Tal. Those works contrast with Seemüller (1909b) for Mitterdorf and Lipold (1984) for the entire Gottschee area because both of those studies indicate that velar fronting

was active. In the remainder of this section I discuss the data from the latter two works.[6]

Lipold (1984) is an extremely valuable work on the sound structure of the dialects of Gottschee. That comprehensive study offers an in-depth synchronic treatment of the phonology of the entire area, concentrating specifically on the seven villages of Suchen, Hinterberg, Klindorf, Niedermösel, Reichenau, Rodine, and Hornberg. The book is accompanied with a tape recording of native speakers from those places – recordings presented in written form on pp. 449–529 in phonemic transcriptions (/…/) and narrow phonetic ones ([…]). Lipold (1984) contains copious data from all seven of the villages referred to above – data indicating that those places had a version of velar fronting to be discussed below. The data in the seven places do not appear to differ from one another in any significant way with respect to the patterning of velars and palatals. I therefore concentrate on one particular place (Hinterberg) as a representative of all of Gottschee.

The material discussed below shows that the velar fricative ([x]), the velar stop ([k]), and the velar affricate ([kx]) all have palatal allophones. The rule accounting for surface palatals (velar fronting) is triggered by all and only front vowels (Lipold 1984: 211–212). Gottschee differs from other German dialects because it possesses central vowels (distinct from schwa) which contrast with front vowels and back vowels. For example, there are the two phonemic short front vowels /i e/, two phonemic short back vowels /u o/, and two phonemic short central vowels ⟦ü ö⟧, which I retain in Lipold's transcription system.[7] In contrast to StG, there are no phonetically front rounded vowels like [y ø] (Lipold 1984: 123). The contrast between front vs. central vs. back is captured in Lipold's feature system with the two binary features [±front] and [±back]. In the present framework I express the contrast with the two features [coronal] and [dorsal]. That system is given in Table 15.2 for the six short vowels mentioned above, together with the short low back vowel /ɑ/.

In the inventory of vowels depicted in Table 15.2 there are front (coronal) vowels, which contrast with back (dorsal) vowels and central vowels, which are unmarked for [coronal] and [dorsal].[8]

[6]Velar fronting is absent in the other former German-language island of Slovenia, namely Zarz (Lessiak 1959; Map 3.3). The Slovene language possesses [x](/x/) but no corresponding palatal (Greenberg 2006). There is also no allophonic process fronting /x/ in Slovene.

[7]The datasets presented below indicate that the reflexes of the central vowels of Gottschee are often equivalent to front rounded vowels in StG (e.g. [y ø]) but that in other cases they correspond to StG back vowels (e.g. [u o]).

[8]An alternative to Table 15.2 is to analyze the central vowels as phonologically [coronal] and to adopt the feature [±round] to distinguish those sounds from front unrounded vowels. In that

Table 15.2: Distinctive features for vowels (Gottschee)

	i	e	ü	ö	u	o	ɑ
[coronal]	✓	✓					
[dorsal]					✓	✓	✓
[low]							+
[high]	+	−	+	−	+	−	

Dorsal fricatives in Hinterberg do not occur word-initially, but dorsal affricates and stops do surface in that context: Palatal [cç] surfaces before front vowels (=13a) and the velar before central vowels (=13b), back vowels (=13c), or [r] (=13d). The transcriptions in (13) are in Lipold's system, which employs symbols very similar to the ones I have adopted in this book.

(13) Word-initial dorsal affricates in Hinterberg

a.	cçe:rts^{ɛ}	Kerze	'candle'	333
	cçe:rb^{ɛ}	Körbe	'basket-PL'	333
	cçepf^{ɛ}	Köpfe	'head-PL'	328
b.	kxüxl̥	Küche	'kitchen'	327
	kxü:ts	kurz	'short'	331
c.	kxa:fm̥	kaufen	'buy-INF'	334
d.	kxrüəkx	Krug	'jug'	335

The two stops [k] and [c] pattern like the affricates; hence, [c] surfaces before front vowels (=14a), and [k] before central vowels (=14b), back vowels (=14c), or liquids (=14d).[9]

(14) Word-initial dorsal stops in Hinterberg

a.	cȩs:^{ɛ}	Schultasche	'book bag'	315
	cȩŋkx	Fußtritt	'kick'	315

alternative approach, phonetic implementation could capture the fact that ⟦ü ö⟧ are not the same vowels as [y ø] in other German dialects. The analysis of ⟦ü ö⟧ in Table 15.2 can be tested by determining whether or not they pattern phonologically as front for processes other than velar fronting.

[9] According to Lipold (1984) the phonemic vowels of Gottschee have allophones, some of which are present in (14), e.g. ⟦ȩ⟧ for /e/). The palatal segments in Gottschee occur in the context of all surface front vowels, including front vowels that are allophones

b.	kük^{ɛ}	Kuckuck	‘cuckoo’	315
	ˈkürtɑːt	nackt	‘naked’	315
	ˈkölːər	Wamme	‘dewlap’	315
c.	kaːɪ̯f	Taschenmesser	‘pocket knife’	315
	ˈkɔkaɪtsn̩	gackern	‘cluck-INF’	315
	kǫʃː	Wagenkorb	‘basket’	315
d.	krɔmp^{ɛ}	Krampen	‘pick’	315
	klas^{ɛ}	Klasse	‘class’	315

Lipold likewise analyzes palatal [ɟ] and velar [g] as allophones word-initially (p. 370). I do not discuss those two stops because of the sparseness of the data containing them.

The data in (15) illustrate the distribution of velar and palatal fricatives in the context after a sonorant: [ç] surfaces after front vowels (=15a) and [x] after central vowels (=15b), back vowels (=15c), or [r] (=15d).

(15) Postsonorant dorsal fricatives in Hinterberg

a.	ˈrɪçtɑr	Richter	‘judge’	301
	ˈesaɪç	Essig	‘vinegar’	309
	gəˈbɪçt	Gewicht	‘weight’	312
	glaːɪ̯ç	gleich	‘soon’	313
	ˈẓleçtɑr	schlechter	‘worse-INFL’	301
	^{u}ɔːẹç^{ɛ}	Eiche	‘oak’	310
	buɔːẹç	weich	‘soft’	312
	ẓlęçt	schlecht	‘bad’	322
b.	vrüxt	Frucht	‘fruit’	319
	ˈütrüxŋ	wiederkäuen	‘chew cud-INF’	309
	gəˈvlöxtn	geflochten	‘braid-PART’	320
	gəˈvlöːxŋ	geflogen	‘fly-PART’	320
	rö̜xŋ	Roggen	‘rye’	303
	bö̜xŋ	Wochen	‘week-PL’	302
	bö̜x^{ɛ}	Woche	‘week’	301
	lö̜x	Loch	‘hole’	316
c.	pruːxtl	gebracht	‘bring-PART’	313
	dɔx	Dach	‘roof’	304
	bɔx^{ɛ}	Wache	‘sentinel’	301
	ręːʌx	Reh	‘deer’	316
	raxt	recht	‘right’	316
	ɬaːx	Lauch	‘leek’	316

d.	dü:rx	durch	‘through’	312
	pi:rx$^{\varepsilon}$	Birke	‘birch tree’	313
	ʃtu:rx	stark	‘strong’	332
	mr̩x$^{\varepsilon}$	Mähre	‘old mare’	316
	vü:rx$^{\varepsilon}$	Furche	‘furrow’	332
	z̥nǫ:ʌrxŋ	schnarchen	‘snore-INF’	321

The dataset in (16) illustrates the distribution of velar and palatal affricates in the context after a sonorant: [cç] occurs after front vowels (=16a), and [kx] after central vowels (=16b), back vowels (=16c), or [r] (=16d).

(16) Postsonorant dorsal affricates in Hinterberg

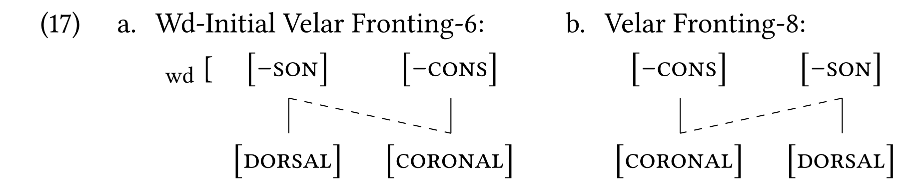
a.	dɪcç$^{\varepsilon}$	dick	‘fat’	312
	ę:ʌbɪcç	ewig	‘eternal’	310
	tuɔẹ̥cç	Teig	‘dough’	300
	z̥mecçŋ	schmecken	‘taste-INF’	321
	ʃtęcçŋ	stecken	‘stick-INF’	323
b.	rükx$^{\varepsilon}$	Rücken	‘back’	300
	tükx	Tücke	‘peril’	314
	z̥mükxŋ	schmiegen	‘nuzzle-INF’	321
	lükx$^{\varepsilon}$	Lücke	‘gap’	301
	bö̜kx	Bock	‘buck’	302
	ʃtö̜kx	Stock	‘stick’	323
	gəˈʃrö̜kxŋ	erschrocken	‘scared-PART’	323
c.	vlakx	Fleck	‘spot’	320
	ˈakxər	Äcker	‘field-PL’	309
	ɫɔkx$^{\varepsilon}$	Lacke	‘village pond’	301
d.	pa:rkx	Berg	‘mountain’	334

Lipold (1984: 370) considers the palatal stops [c ɟ] to be allophones of /k g/ in postsonorant position, although the only example found for Hinterberg is the word [ˈglɪclɪç] ‘fortunate’ for [c] (p. 313).

The formal rules for Hinterberg are stated below for word-initial position (=17a) and postsonorant position (=17b). The triggers for both rules include all and only front vowels but not central vowels, back vowels, or coronal consonants. The target segments for (17b) must minimally include the fricative /x/ and the affricate /kx/. I opt for a broader set of targets, which also includes the stops /k/ and /g/. Although only one example was found for /k/ and no examples for

/g/, I posit the broad set of targets on the basis of Lipold's characterization of palatal stops as allophones in postsonorant position. For word-initial position (=17a) the targets must consist of all dorsal obstruents.

(17) a. Wd-Initial Velar Fronting-6: b. Velar Fronting-8:



A second description for a Gottschee dialect is Seemüller (1909b), which is a very brief work consisting of phonetic transcriptions of the Wenkerbogen and other short texts for the Mitterdorf dialect. The transcriptions contain enough words with [ç] (=⟦x⟧) and [x] (=⟦χ⟧) to conclude that the village of Mitterdorf once had a synchronic rule of velar fronting. Consider the examples presented in (18).[10] I retain the transcriptions in the original.

(18) Dorsal fricatives in Mitterdorf:

a.	ix	ich	'I'	25
	mīlix	Milch	'milk'	25
	gəšixtə	Geschichte	'story'	26
	entlix	endlich	'finally'	28
	tsēxnɑi	zehn	'ten'	25
	šlextə	schlechte	'bad-INFL'	26
	dəroixŋ	erreichen	'reach-INF'	28
	lɑixtə	leichter	'easier'	28
b.	bö̜χŋ	Wochen	'week-PL'	25
	nöχ	noch	'still'	25
	khöχlefl	Kochlöffel	'wooden spoon'	26
c.	khūχŋ	Kuchen	'cake'	25
	gəprūχt	gebracht	'bring-PART'	27
	toχtər	Tochter	'daughter'	25
	moχŋ	machen	'do-INF'	26

[10] Mitterdorf also possesses the corresponding lenis fricatives [ʝ] (=⟦ɣ⟧) and [ɣ] (=⟦g̠⟧), which I do not discuss because the texts in Seemüller (1909b) contain only a few items with those segments. (The two words found with ⟦ɣ⟧ occurred after the front vowels [ɪ] and [eː]). The texts in Seemüller (1909b) also contain many words with velar stops ([k kʰ g]), which surface without change after front segments. None of the data presented in that source indicate that velar fronting is active in word-initial position.

	rɑχt	recht	'right'	27
	hōɒχ	hoch	'high'	27
	hēɒχtər	höher	'higher'	27
	gəwīəχtət	gefürchtet	'fear-INF'	28
d.	düɒrχs	durch	'through'	25
e.	trökχnən	trockenen	'dry-INFL'	25

I posit that the features for vowels in Table 15.2 also hold for Mitterwald. Thus, [ç] surfaces after front vowels (=18a) and [x] after central vowels (=18b), back vowels (=18c), or [r] (=18d). One example was found with the velar affricate in the context after a front rounded vowel (=18e), which is consistent with an analysis in which /k/ and /kx/ pattern the same way. The formal rule of velar fronting in (19) for Mitterdorf is Velar Fronting-13 (=4).

15.6 Grisons

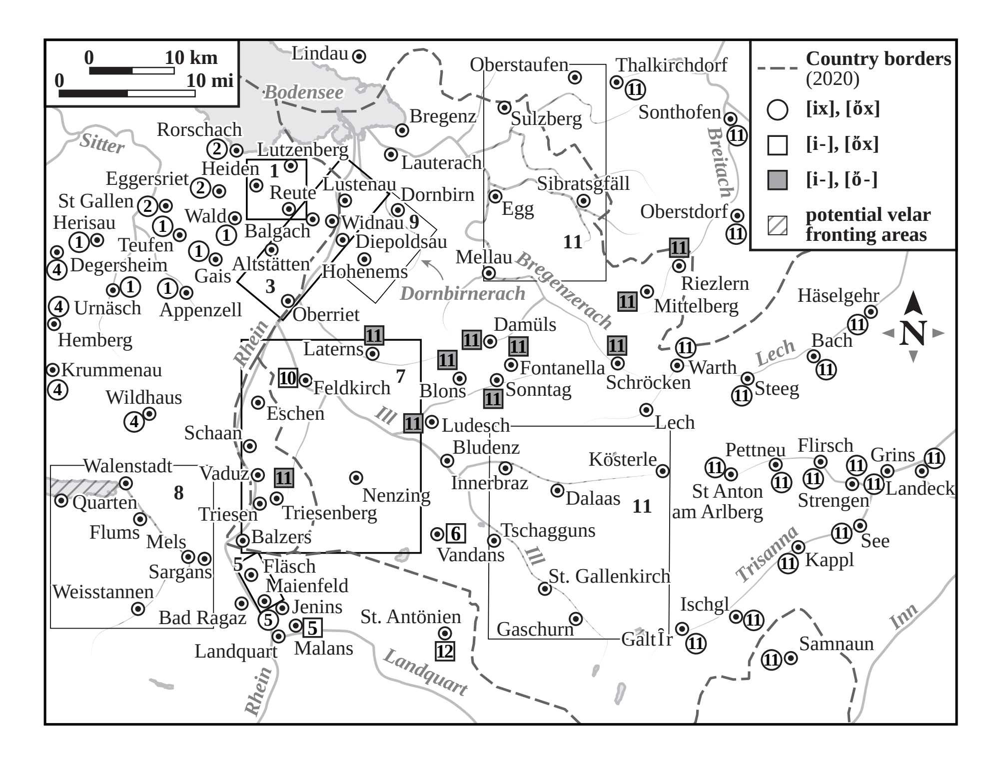
In §6.3 the dialect of Obersaxen was identified as a Walser variety of HstAlmc spoken in West Grisons (Graubünden); Map 15.5. As indicated on that map, Obersaxen is a German-language island because it is encircled by areas populated with speakers of Romansh, a language with neither [ç] nor [x]; see Anderson (2016). There is no question that Obersaxen represents a velar fronting island because Obersaxen itself is a German-language island.

Recall the generalizations concerning velar fronting in Obersaxen: Velars (/x/ and /kx/) surface as palatal in word-initial position before a nonlow front vowel (Wd-Initial Velar Fronting-5) and in postsonorant position after a nonlow front vowel (Velar Fronting-7).

Wiesinger (1983a: 904–906) identifies a number of other places in Grisons which are populated with speakers of Walser German, but an examination of the sources for those varieties reveals that those places do not have velar fronting. Three examples indicated on Map 15.5 are Nufenen (Gröger 1914c), Mutten (Hotzenköcherle 1934), and Schanfigg (Kessler 1931). A more remote (SBav) variety of German in Grisons without velar fronting is Samnaun (Gröger 1924). (I discuss the status of velar fronting in the data from the linguistic atlas of Switzerland (SDS) in §15.7).

The closest place to Obersaxen with velar fronting is Walser German variety of Vals (Gröger 1914e). Like Obersaxen, Vals is a German-language island situated in a German-speaking area without velar fronting.[11]

[11] Map 15.5 also indicates that there is a geographically more distant velar fronting place in North Grisons (Maienfeld; Meinherz 1920) which was discussed in §3.3; see also §15.11.



Map 15.9: East Switzerland, Liechtenstein, Vorarlberg, and West Tyrol. Circles indicate no postsonorant velar fronting, white squares (assimilatory) velar fronting, and diagonal squares (potential) velar fronting. 1=Vetsch (1910), 2=Hausknecht (1911), 3=Berger (1913), 4=Wiget (1916), 5=Meinherz (1920), 6=Jutz (1922), 7=Jutz (1925), 8=Trüb (1951), 9=Gabriel (1963), 10=Bethge & Bonnin (1969), 11=VALTS, 12=SDS.

15.11.1 Areas with no velar fronting

In the eastern parts of Map 15.9 velars like /x/ surface as [x] regardless of context. Those places extend from the town of Samnaun (Switzerland) in the south to Oberstdorf, Sonthofen, and Thalkirchdorf (in Allgäu, Germany) in the north, as well as the numerous villages of Austria (West Tyrol) in between. The western part of Map 15.9 (Switzerland) is also characterized by an absence of velar fronting. This is clearly the case in the northwest from Lake Constance (Bodensee) extending south to the areas around St. Gallen and Appenzell and further south to Toggenburg (e.g. Krummenau, Wildhaus). Not depicted on Map 15.9 is the non-velar fronting area in the canton of Glarus described by Streiff (1915) to the west of Walenstadt and Quarten.

The conclusion is that there is a relatively narrow central region between those two broad non-velar fronting areas on the periphery. The narrow region referred to here is characterized by velar fronting (or potential velar fronting) and forms – roughly speaking – a column of about 65km from east to west and 70km from north to south.[26]

15.11.2 Velar fronting areas

Two velar fronting varieties are attested in Northeast Switzerland. The first is the Rheintal dialect in the canton of St. Gallen (Berger 1913), which was discussed in §3.4. The second is the dialect spoken in Appenzell described by Vetsch (1910). This region subsumes the two cantons of Appenzell Innerrhoden and Appenzell Ausserrhoden, which are both completely surrounded by the canton of St. Gallen.

According to Vetsch (1910: 16), the velar obstruents [k g x kx] can show some degree of coarticulatory fronting in the context before and after front vowels throughout the Appenzell region. However, in part of that area the velar fricative [x] – including the corresponding geminate [xx] – and the velar affricate [kx] surface as palatal (=⟦χ χχ kχ⟧) in the neighborhood of front sounds. Vetsch (1910: 6) calls the area with these palatal sounds Kurzenberg, which subsumes five municipalities (Gemeinden) of Appenzell Ausserrhoden (Heiden, Lutzenberg, Wolfhalden, Walzenhausen, Reute), as well as one municipality of Appenzell Innterrhoden (Oberegg). In the parts of Appenzell not belonging to Kurzenberg, dorsal fricatives and affricates surface as velar even in the context of front sounds. The velar fronting areas Vetsch calls Kurzenberg are situated roughly in the rectangle indicated on Map 15.9.

[26] I am aware of three studies for places in Vorarlberg documenting the absence of velar fronting within that column. Those three places are Hohenems (Seemüller 1909a), Nenzing (Schneider & Marte 1910), and Lauterach (Schneider & Marte 1910). It is possible that the non-velar fronting areas depicted on Map 15.9 were once more extensive than they are in the present day.

The Kurzenberg examples in (42) show the distribution of the velar affricate and its palatal counterpart. In word-initial position, [kx] surfaces a back vowel (=42a) and the palatal [kç] before a front vowel (=42b) or coronal sonorant consonant (=42c). The data in (42) are accounted for formally with Wd-Initial Velar Fronting-8 (=12).

(42) Dorsal affricates in Appenzell (Kurzenberg):

a.	kxɔštə	[kxɔʃtə]	kosten	‘cost-INF’	160
	kxɑts	[kxɑts]	Katze	‘cat’	160
b.	kχištə	[kçiʃtə]	Kiste	‘box’	160
	kχellə	[kçellə]	Kelle	‘trowel’	160
c.	kχrɔt	[kçrɔt]	Kröte	‘toad’	160
	kχlɛbə	[kçlɛbə]	kleben	‘stick-INF’	160
	kχnǖ	[kçnyː]	Knie	‘knee’	160

The data in (43) illustrate that the occurrence of postsonorant velars and palatals in Kurzenberg is a function of the preceding vowel. It can be seen here that velars occur after full back vowels (=43a) or after a diphthong ending in schwa (=43b) and that palatals surface after front vowels (=43c). Note that the vowel preceding schwa in (43b) is front. The only examples provided by Vetsch for category (43c) have high front vowels. The optionality involving tonic vowels ([y] vs. [yə]) illustrated in the final example in (43b) and (43c) shows the regularity of velar fronting: If the vowel is front ([y]) then /xx/ surfaces as palatal, but if it surfaces as a diphthong ending in a back vowel (schwa), then /xx/ is realized as velar.

(43) Dorsal fricatives in Appenzell (Kurzenberg):

a.	lɔxx	[lɔxx]	Loch	‘hole’	161
	mɑxxə	[mɑxxə]	machen	‘do-INF’	161
b.	štiəxx	[ʃtiəxx]	Stich	‘sting’	102
	ksiəxt	[ksiəxt]	Gesicht	‘face’	102
	trüəxxnə	[tryəxxnə]	trocknen	‘dry-INF’	102
c.	līχt	[liːçt]	leicht	‘easy’	102
	siχχər	[siçər]	sicher	‘certainly’	102
	trüχχnə	[tryççnə]	trocknen	‘dry-INF’	161

Recall from §3.4 that the set of velar fronting triggers for Rheintal is restricted to nonlow front vowels because phonologically [+low] sounds like /ɛ/ fail to induce fronting (=Velar Fronting-2 in 21a). Since Vetsch does not provide the crucial

data for /x/ in the context of vowels like /ɛ/ it is not possible to say whether or not Appenzell and Rheintal are the same or different in terms of triggers. In any case, the data in (43) can be captured with either Velar Fronting-1 (=2) or Velar Fronting-13 (=4).

One difference between the two neighboring dialects is the patterning of dorsal fricatives in the context after a diphthong consisting of a front vowel plus schwa. As indicated in (43b) the velar fricative in Appenzell surfaces in that context. By contrast, in Rheintal the palatal surfaces in this environment (e.g. [liːəçt] 'light'). The occurrence of the palatal was accounted for with Schwa Fronting-1 (§3.4), which is present in Rheintal, but absent in Appenzell.

The third velar fronting variety in East Switzerland is the one described by Meinherz (1920). Recall from §3.3 that Meinherz's dialect (Maienfeld) subsumes three velar fronting municipalities, namely Maienfeld, Fläsch and Malans. By contrast, the neighboring community of Jenins has no velar fronting. All of those places are indicated on Map 15.9.

The fourth velar fronting area depicted on Map 15.9 is the one described by Jutz (1925), which comprises all of Liechtenstein and South Vorarlberg. It is clear from Jutz (1925) that Liechtenstein-South Vorarlberg has both velar and palatal fricatives. Jutz (1925: 26) writes: "Der Reibelaut χ wird im ganzen Gebiete zwischen den ɑχ- und iχ-Laut unterschieden, von denen hier der velare mit χ, der palatale mit x bezeichnet wird". ("The fricative χ is differentiated in the entire area between the ɑχ- and iχ-Laut, of which the velar is transcribed here with χ and the palatal with x"). At a later point (p. 207), Jutz makes it clear that the dialect also distinguishes palatal and velar affricates.

In word-initial position, the velar affricate occurs before a back vowel (=44a) and the corresponding palatal before a front vowel (=44b) or a coronal sonorant consonant (=44c).[27] The distribution of velars and palatals in (44) can be captured formally with Wd-Initial Velar Fronting-8 (=12).

(44) Dorsal affricates in Liechtenstein-South Vorarlberg:

a.	kχunt	[kxunt]	kommt	'come-3SG'	215
	kχoštə	[kxoʃtə]	kosten	'cost-INF'	207
	kχɑts	[kxɑts]	Katze	'cat'	207
b.	kxīmmə	[kçiːmmə]	Keim	'germ'	207
	kxįfl	[kçɪfl̩]	Kiefer	'pine tree'	229

[27] Affricates are also attested in some parts of Liechtenstein-South Vorarlberg in postsonorant position, but I do not consider these data because of the irregularities referred to in Jutz (1925: 207).

	kxǣr	[kçæːr]	Keller	‘cellar’	223
	kxiərhə	[kçiərhə]	Kirche	‘church’	224
c.	kxrę̄ijə	[kçrɛːijə]	krähen	‘crow-INF’	207
	kxlī	[kçliː]	klein	‘small’	207
	kxnęxt	[kçnɛçt]	Knecht	‘vassal’	207

The data in (45) illustrate the distribution of velar and palatal fricatives in postsonorant position. The velar surfaces after a back vowel (=45a) and the palatal after a front vowel (=45b), or a liquid (=45c). If the first part of a schwa-final diphthong is a front vowel then the dorsal fricative following that diphthong is palatal (=45d), but if the first component of a schwa-final diphthong is a back vowel then a dorsal fricative after that diphthong is velar (=45e). This is the default pattern which can be captured with Velar Fronting-1 (=2).

(45) Dorsal fricatives in Liechtenstein-South Vorarlberg:

a.	rų̄χ	[rʊːx]	Rauch	‘smoke’	209
	tɑχ	[dɑx]	Dach	‘roof’	209
b.	glīx	[gliːç]	gleich	‘same’	210
	ix	[iç]	ich	‘I’	210
	štįx	[ʃtɪç]	Stich	‘sting’	209
	flüxt	[flyçt]	flicht	‘braid-3SG’	212
	ręxnə	[rɛçnə]	rechnen	‘calculate-INF’	207
	ǣxərle	[æːçr̩li]	Eichhörnchen	‘squirrel’	213
c.	melx	[melç]	Milch	‘milk’	209
	štɑrx	[ʃtɑrç]	stark	‘strong’	208
d.	tsīəxl	[tsiːəçli]	Zieche, dim	‘cover-DIM’	207
	nüəxtr	[nyəçtr̩]	nüchtern	‘sober’	214
e.	būəχ	[buːəx]	Buch	‘book’	209

To summarize: In postsonorant position and in word-initial position, velar fronting applies in the context of any coronal sonorant. The contrast between palatal and velar in (45d, 45e) requires Schwa Fronting-1 to feed postsonorant velar fronting, as in Rheintal.[28]

[28] Jutz transcribes the palatal fricative occasionally after back vowels, e.g. ⟦prūxt⟧ ‘use-PART’, ⟦fǭxt⟧ ‘catch-3SG’, ⟦ǣnədɑxtsk⟧ ‘eighty-one’. These could be transcriptional errors. Alternatively, they might indicate that certain speakers have nonassimilatory velar fronting (Trigger Type F; Chapter 14).

The fifth velar fronting place in the region depicted on Map 15.9 is the town of Vandans in Vorarlberg (Jutz 1922). Jutz observes that Vandans possesses both velar and palatal fricatives and affricates. He writes (p. 276): "Von den Reibelauten bezeichnen χ und x das schriftdeutsche ch, doch mit dem Unterschiede, daβ eine Zweiteilung in den sogegannten ɑχ- und ix-Laut vorgenommen wurde…Diese beiden Laute werden in der Mundart von Vandans und Umgebung deutlich auseinandergehalten". ("Among the fricatives, χ and x depict written German ch with the difference that a distinction between the so-called ɑχ- and ix-sound was made…These two sounds are clearly distinguished in the dialect of Vandans and in the vicinity thereof").

In word-initial position the velar affricate occurs before back vowels (=46a), while the palatal affricate surfaces before front vowels (=46b) or coronal sonorant consonants (=46c). The patterning of velars and palatals in (46) is expressed formally with Wd-Initial Velar Fronting-8 (=12).

(46) Dorsal affricates in Vandans:

a.	kχūə	[kxuːə]	Kuh	'cow'	290
	kχųrts	[kxʊrts]	kurz	'short'	290
	kχɑts	[kxɑts]	Katze	'cat'	292
b.	kxind	[kçind]	Kind	'child'	289
	kxį̄rə	[kçɪːrə]	kehren	'sweep-INF'	289
	kxünɩg	[kçynɪg]	König	'king'	290
	kxü̧rpsə	[kçʏrpsə]	Kürbis	'pumpkin'	290
	kxessɩ	[kçessɪ]	Kessel	'kettle'	292
c.	kxrumm	[kçrumm]	krumm	'bent'	292
	kxlębə	[kçlɛbə]	kleben	'stick-INF'	292
	kxlī	[kçliː]	klein	'small'	296

The items listed in (47) reveal that velar fricatives (singleton and geminate) occur after any back vowel (=47a) and that palatals surface after any front vowel (=47b). The occurrence of palatal in (47c) and velar in (47d) can be accounted for with Schwa Fronting-1, as in Rheintal (§3.4) and Liechtenstein-Vorarlberg.[29] The formal rule for (47) is Velar Fronting-1 (=2).

[29] It is not clear whether or not [x] or [ç] surfaces after a consonant because Jutz has words illustrating both patterns, e.g. ⟦wærχχə⟧ 'work-INF' vs. ⟦fųrxtiktǖr⟧ 'terribly expensive'. The occurrence of the palatal affricate before liquids in (46c) suggests that [ç] should be the expected dorsal fricative in the mirror image context (i.e. after liquids). A few of the examples in Jutz (1922) have [x] after a back vowel, e.g. ⟦nɑxt⟧ 'night'.

(47) Dorsal fricatives in Vandans:

a.	rų̄χ	[rʊːx]	Rauch	‘smoke’	292
	lǫχχ	[lɔxx]	Loch	‘hole’	292
	bɑχχ	[bɑxx]	Bach	‘stream’	292
b.	glīx	[gliːç]	gleich	‘same’	292
	ix	[iç]	ich	‘I’	292
	ksįxt	[ksɪçt]	Gesicht	‘face’	292
	krį̄xt	[krɪːçt]	gerichtet	‘judge-PART’	289
	fēx	[feːç]	Vieh	‘cattle’	292
	knęxt	[knɛçt]	Knecht	‘vassal’	291
c.	līəxt	[liːəçt]	Licht	‘light’	292
d.	pūəχ	[puːəx]	Buch	‘book’	296

In sum, word-initial velar fronting is triggered by all coronal sonorants and postsonorant velar fronting by front vowels.[30]

Bethge & Bonnin (1969) provide a phonetically transcribed text from a native speaker of the Feldkirch dialect (Vorarlberg). The text distinguishes velar fricatives ([x]) from palatal fricatives ([ç]). Although the number of words with those sounds is small, the generalization can be made that [x] surfaces after a back vowel ([ɑ ɑː ʊ]) and [ç] after a front vowel ([ɪ ʏ]). The text contains no examples of dorsal fricatives after sonorant consonants.

The one place in East Switzerland which is indicated in the SDS maps in Table 15.4 with prepalatal symbols is the Walser settlement of St. Antönien in North Grisons. In (48) I give the SDS transcriptions for some of the words in that variety of German. On the basis of (48) I conclude that St. Antönien is a velar fronting variety of SwG, although not enough data are available to draw conclusions concerning the set of triggers.

(48) Prepalatal fricatives and affricates in St. Antönien (SDS):

a.	Kind	χ’’
b.	drücken	trükχ’ə
c.	Gestank	ŝtą̄χ’
d.	Bank	bẹχ’
e.	stinkt	štīχ’t
f.	Speicher	īχ’

[30]In Vandans, the low front vowels [æ æː] are apparently restricted in their distribution to the context before liquids (Jutz 1922: 289); hence, dorsal fricatives do not occur after those sounds. (No example was found with a word-initial dorsal affricate before a low front vowel).

Finally, I consider the status of velar fronting as indicated on the maps listed in Table 15.5 from VALTS. Recall from Table 15.6 that VALTS recognizes three places of articulation for dorsal sounds, namely velar (⟦x⟧), palatal (⟦χ⟧), and prepalatal (⟦χ'⟧/⟦χ''⟧). Since it is not clear whether or not the palatal markers indicate phonologically [coronal, dorsal] sounds as opposed to phonologically simplex [dorsal] sounds that surface as phonetically fronted velars (prevelars), I focus on those places with the prepalatal markers. An inspection of the maps from Table 15.5 reveals the six velar fronting areas listed in Table 15.10. In the first column I list the area and in the second column villages and towns within that area. The first five of those areas are listed under the names for the respective valleys, while the sixth area is a specific town in Liechtenstein. In the third column I give the maps from VALTS which have prepalatal markers for the towns listed in the second column. Note that the final place listed in Table 15.10 (Triesenberg) is part of a larger area (Liechtenstein) in which velar fronting is attested (recall 45 and 46). The places listed in Table 15.10 also have in common that they were settled by people from Upper Valais during the Walser Migrations (§6.3; Bohnenberger 1913, Wiesinger 1983a: 902).

Table 15.10: Velar fronting areas in Vorarlberg/Liechtenstein on the basis of the maps in VALTS

Area	Town/village	VALTS maps (volume III)
Kleinwalsertal	Mittelberg, Riezlern	40a-b, 45a-b, 46, 47, 49–53
Damülser Tal	Damüls	40a-b, 45a-b, 46, 47, 49–53
Tal der Bregenzer Ache	Schröcken	40a-b, 45a-b, 53
Großes Walsertal	Sonntag, Blons, Fontanella, Raggal	40a-b, 45a, 53
Laternsertal	Laterns	45a-b, 53
Liechtenstein (Oberland)	Triesenberg	45a-b, 46, 47, 49, 53

Since the velar fronting places listed above have prepalatals in postsonorant position after front vowels, liquids, and back vowels and in word-initial position before any sound, they are characterized by nonassimilatory velar fronting (Trigger Type F; Chapter 14). No indication is given in VALTS that the velar fronting places in Table 15.10 have velar [x]; thus, historical /x/ has restructured to /ç/.

15.11.3 Potential velar fronting areas

Trüb (1951) investigates the historical development of vowels in the SwG dialect spoken in the area of Walensee-Seeztal (to the west of Liechtenstein). In his

charts for consonants (pp. xix–xx), Trüb classifies all dorsal stops and fricatives (fortis/lenis/long/short) – his ⟦k g χ⟧ – as "palatal", although he lists the equivalent nasal (⟦ŋ⟧) as "velar". In Footnote 1 (p. xx) he writes: "Das *ch* unserer Landschaft wird im allgemeinen palatal gebildet, also weder präpalatal noch velar". ("The *ch* in our region is generally pronounced palatal, that is neither prepalatal nor velar"). Given this statement and the proximity of Walensee-Seeztal to the velar fronting areas to the immediate east, I consider it possible that velar fronting may be active in the region. However, given the brevity of the statement in Footnote 1, it is also possible that Trüb's "palatals" may in fact be prevelars; recall Kollmann's (2007) conclusion concerning the realization of sounds like /x/ in Laurein.

Gabriel (1963) investigates historical changes affecting vowels and the inflectional morphology in Vorarlberger Rheintal, a large region in Northwest Vorarlberg which subsumes Dornbirn, Lustenau, and Hohenems. In the section on the phonetics of consonants, Gabriel (1963: 79) provides a one-page description of fricatives. In his transcription system (p. 45), ⟦x⟧ and ⟦χ⟧ represent voiceless lenis and voiceless fortis respectively. Gabriel provides a concise statement concerning the place of articulation of ⟦x⟧ and ⟦χ⟧ on p. 79: "x, χ bezeichnet immer den ich-Laut". ("x, χ always denote the ich-Laut"). On the basis of that terse statement, it could be the case that (nonassimilatory) velar fronting was active historically in the region; however, it could also be the case that we are dealing with prevelars. (In contrast to VALTS and SDS, Gabriel presupposes only two places of articulation for dorsal fricatives).

VALTS provides a wealth of data from most of the places listed on Map 15.9. Recall that the velar fronting areas listed in Table 15.10 all have prepalatal markers (⟦χ'⟧/⟦χ''⟧) for the maps listed in Table 15.5. Those maps also indicate a number of places in Vorarlberg with palatal markers (⟦χ⟧). Two of those broad areas are indicated on my Map 15.9. First, there is the region south of Lech and east of Vandans. Second, there is the area around Oberstaufen (Allgäu, Germany) extending south to the area around Mellau (Vorarlberg, Austria). Since /x/ is realized in these two regions as "palatal" it is possible that they are characterized by velar fronting, but it is also conceivable that the "palatals" represent phonetically fronted velars (prevelars).

It is not easy to determine the status of the narrow – but sizable – velar fronting column depicted on Map 15.9. On the one hand, it is possible that that column represents several different velar fronting enclaves (islands) that happen to be in the same general vicinity. On the other hand, it could be that the region as a whole is one large velar fronting area. Since the northernmost potential velar fronting region on Map 15.9 extends into an area in Southwest Germany with

velar fronting (Swabia), the second interpretation suggests that the column is not a velar fronting island at all, but instead a velar fronting peninsula.

15.12 Summary

Table 15.11 lists the places with postsonorant velar fronting discussed in this chapter. I include not only those places that are uncontroversially velar fronting islands but also some of the places discussed in §15.11 that are probably parts of a large velar fronting peninsula. The modern-day countries are listed in the second column (AT = Austria, CH = Switzerland, CZ = Czech Republic, LI = Liechtenstein, IT = Italy, SL = Slovenia). I do not include any of the areas referred to as potential velar fronting areas, nor do I give those sources with a dataset that is too sparse to determine velar fronting triggers. For greater transparency I summarize the triggers for postsonorant velar fronting in the final column of Table 15.11 in lieu of the formal rules posited above. If velar fronting is induced by one or more consonant, then this information is stated in the final column. If not enough data are presented in the source to determine whether or not consonants serve as velar fronting triggers, then no reference to consonants is made in the final column. Most of the case studies summarized here only mention data involving liquids (/r l/) as triggers and omit /n/; hence, one can only speculate that the latter sound will always be a velar fronting trigger if one or more of the liquids do.[31]

The significance of Table 15.11 is that it lists a number of geographically disperse places with a wide variety of velar fronting triggers. In certain cases, the triggers represent common patterns, while in other cases they are either rare or otherwise unattested in German dialects. In the following summary I relate how those findings match up with the historical stages posited in Chapter 12 and Chapter 14.

The narrowest set of triggers is attested in Visperterminen (high front vowels but not coronal sonorant consonants), while a slightly broader one (nonlow front vowels but not coronal sonorant consonants) can be observed in Obersaxen. Chapter 13 demonstrates that the pattern for Visperterminen (Stage 2a) is the norm in Lower Bavaria; the restricted set of triggers for Obersaxen (Stage 2b) is attested outside of Switzerland and depicted on Map 12.1. Rothmühl represents a restricted case of triggers that is otherwise only occurring in South Mecklenburg (front unrounded vowels; Stage 2a''). According to one description of St. Stephan,

[31]Table 15.11 categorizes places only according to the triggers because the places discussed in this chapter do not display variation concerning the target segments. One exception is Gottschee, where according to Lipold (1984) the targets for postsonorant and word-initial velar fronting consist of all velar obstruents.

Table 15.11: Velar fronting triggers (postsonorant) in velar fronting islands

Place		Source	Velar fronting triggers
Libinsdorf	CZ	Weinelt (1940)	FV or /l r n/
Iglau	CZ	Stolle (1969)	FV but not /r/
Altstadt	CZ	Seemüller (1908b)	FV
Langenlutsch	CZ	Janiczek (1911)	FV but not /r/
Rathsdorf	CZ	Graebisch (1915)	FV
Michelsdorf, Rehsdorf	CZ	Benesch (1979)	FV
Mährisch Hermersdorf	CZ	Benesch (1979)	FV or /r/
Vorder-Ehrnsdorf, Augezd, Kornitz	CZ	Benesch (1979)	FV but not /r/
Rothmühl	CZ	Benesch (1979)	Front unrounded V but not /r/
Giazza/Dreizehn Gemeinden	IT	Schweizer (1939)	FV or liquids (and back V for some speakers)
Giazza/Dreizehn Gemeinden	IT	Mayer (1971)	FV or liquids
Hinterberg (and other places	SL	Lipold (1984)	FV but not /r/
Mitterdorf	SL	Seemüller (1909b)	FV but not /r/
Vals	CH	Gröger (1914e)	Nonlow FV or liquids
Obersaxen	CH	Brun (1918)	Nonlow FV but not liquids
Visperterminen	CH	Wipf (1910)	High FV but not liquids
Lötschental	CH	Henzen (1928)	Nonlow FV or liquids
Upper Valais	CH	Rübel (1950)	FV or liquids
Bellwald	CH	Schmid (1969)	FV or liquids
Ried-Brig	CH	Werlen (1977)	FV
St. Stephan	CH	Zahler (1901)	Front nonnasalized V
Frutigen	CH	Gröger (1914a)	FV
Saanen	CH	Gröger (1914d)	FV or /l/
Silltal	AT	Egger (1909)	Nonlow FV or liquids
Passeiertal	IT	Insam (1936)	FV, liquids, or back V
Ötztal, Passeiertal	AT; IT	VALTS	FV, liquids, or back V
Appenzell	CH	Vetsch (1910)	FV
Rheintal	CH	Berger (1913)	Nonlow FV or liquids
Maienfeld	CH	Meinherz (1920)	FV or liquids
Vandans	AT	Jutz (1922)	FV
Liechtenstein-South Vorarlberg	LI; AT	Jutz (1925)	FV or liquids
Feldkirch	AT	Bethge & Bonnin (1969)	FV

the velar fronting triggers consist solely of front nonnasalized vowels. The latter pattern is the only one of its kind in German dialects and that it is also extremely rare outside of Germanic. The set of nonlow front vowels or liquids (Stage 2c) is attested as a trigger in Vals, Lötschental, Silltal, and Rheintal. The default pattern for German dialects (front vowels or liquids as postsonorant velar fronting triggers) is well-attested in the material investigated in the present chapter (Stage 2d). Finally, the nonassimilatory velar fronting (Stage 2e) is well-documented for several places (e.g. Ötztal).

Table 15.12 presents the velar fronting triggers for word-initial position for the places discussed in this chapter. That table shows that there is considerable variation concerning velar fronting triggers in word-initial position. For example, there is a narrow set of triggers in Visperterminen (Stage 2a), Obersaxen (Stage 2b), Lötschental and Rheintal (Stage 2c), South Vorarlberg-Liechtenstein (Stage 2d), and Ötztal (Stage 2e).

Table 15.12: Velar fronting triggers (word-initial) in velar fronting islands

Place		Source	Velar fronting triggers
Giazza/Dreizehn Gemeinden	IT	Schweizer (1939)	FV or liquids (and back V for some speakers)
Hinterberg (and other places)	SL	Lipold (1984)	FV but not /r/
Vals	CH	Gröger (1914e)	FV but not liquids
Obersaxen	CH	Brun (1918)	Nonlow FV but not liquids
Visperterminen	CH	Wipf (1910)	High FV but not liquids
Lötschental	CH	Henzen (1928, 1932)	Nonlow FV or liquids
Upper Valais	CH	Rübel (1950)	FV or liquids
Bellwald	CH	Schmid (1969)	FV or liquids
Ried-Brig	CH	Werlen (1977)	FV
St. Stephan	CH	Zahler (1901)	FV
Frutigen	CH	Gröger (1914a)	FV or /n/
Saanen	CH	Gröger (1914d)	FV or /n/
Ötztal, Passeiertal	AT; IT	VALTS	FV, liquids, or back V
Appenzell	CH	Vetsch (1910)	FV or /r, l, n/
Rheintal	CH	Berger (1913)	Nonlow FV or liquids
Vandans	AT	Jutz (1922)	FV or liquids
Liechtenstein-South Vorarlberg	LI; AT	Jutz (1925)	FV

With the exception of St. Stephan, all of the historical stages described in Tables 15.11 and 15.12 are attested in the varieties of velar fronting discussed in Chapters 3–13. The importance of velar fronting triggers for velar fronting islands is that – as islands – velar fronting must have phonologized in each place independently (polygenesis). It is therefore remarkable that the places listed in Tables 15.11 and 15.12 confirm to the typologically attested generalizations discussed in Chapter 12 and Chapter 13. For example, the segments inducing (assimilatory) velar fronting consist of a natural class drawn from the set of sounds referred to throughout this book as coronal sonorants. The attested natural classes for triggers listed in Tables 15.11 and 15.12 obey the Implicational Universal for Palatalization Triggers without exception; hence, none of the unattested Trigger Types discussed in §12.8.1 can be found among velar fronting islands.

The one unique case mentioned above (St. Stephan) is consistent with the rule generalization approach adopted in this book. The set of velar fronting triggers in that place (front oral vowels) suggests that that natural class be assigned a unique Trigger Type with its own historical stage. All other velar fronting varieties of German discussed in this book fall into two groups: (a) those with only oral vowels and (b) those with oral vowels and nasalized vowels but where dorsal fricatives are absent after the latter sounds (e.g. Visperterminen). Since St. Stephan is the only velar fronting variety discovered in which dorsal fricatives occur in the context after front nasalized vowels it is not possible to know how rare or common that pattern is.

16 When and where was velar fronting phonologized?

16.1 Introduction

Although the preceding chapters have offered a diachronic treatment of velar fronting in a broad spectrum of German dialects, nothing at all has been said about how that change fits into the well-established stages in the history of German (Appendix E). In the present chapter I demonstrate how the linguistic evidence discussed in this book can shed light on when velar fronting was phonologized. That linguistic evidence is shown to be corroborated by philological evidence discussed in the earlier literature. I also discuss the extent to which the material from German dialects discussed in previous chapters can shed light on where velar fronting was phonologized.

Establishing an accurate time frame for the phonologization of velar fronting requires that I consider first word-initial position (§16.2) and then postsonorant position (§16.3). The question of where (geographically) velar fronting might have been phonologized can be found in §16.4. Next, I address the issue of directionality as it relates to the earliest phonologized rule of velar fronting (§16.5). In §16.6 I take a closer look at the historical model proposed in §2.5 and show how it accounts for the general patterns discussed in Chapters 3–13. Finally, in §16.7 I discuss the extent to which it is possible to make meaningful statements concerning why velar fronting was phonologized in a certain place and time but not in another place or time.

16.2 Word-initial position

Insight into the dating of the fronting of word-initial WGmc $^{+}$[ɣ] can be adduced from those dialects in which that original velar is now an opaque palatal (Chapters 7–8). Recall that opaque palatals are underlying segments like /ç/ or /ʝ/ occurring in the context of a nonfront sound that was historically front ([coronal]). It was argued at length that opaque palatals were once palatal allophones of velars at the point in time before the original front trigger ([coronal]) was removed.

Significantly, velar fronting must have been active before the elimination of the original [coronal] trigger. If the chronology of the latter change can be ascertained then it stands to reason that the dating of the originally allophonic rule of velar fronting can be inferred as well.[1]

A plethora of dialects was discussed earlier in which the reflex of WGmc ⁺[ɣ] is palatal in word-initial position before front vowels or before schwa in the *ge-* prefix (e.g. [çə]/[ʝə]; cf. StG [gə]) but velar before full back vowels. Examples include Eph (Dorste, §4.4; Eilsdorf, §8.3; Dingelstedt am Huy, §8.4), Wph (Elspe and Schieder-Schwalenberg, §7.2), as well as several LG and CG varieties spoken in the northeast of pre-1945 Germany in Chapter 11. In such dialects, the realization of an etymological velar as palatal before schwa follows if that palatal was created by velar fronting when schwa was still [i]. The chronology of the sound change producing schwa from full vowels like [i] (Vowel Reduction) can be ascertained to a fair degree of accuracy on the basis of orthographic evidence.[2] The assimilatory fronting of WGmc ⁺[ɣ] before an etymological [i] in word-initial position is most prevalent in LG. However, since much more is known on the time frame for Vowel Reduction in HG, I discuss first that evidence before I consider parallel data from LG.

The earliest attested stages of HG were OHG (750–1050) and MHG (1050–1350). In OHG the prefix referred to above was rendered orthographically as *ga-*, *gi-*, and *ge-*, whose vowels I interpret as [ɑ], [i], and [ə] respectively (Braune 2004: 73–74). In general it can be said that *ga-* was significantly more common in early OHG, but that *gi-* and then later *ge-* established themselves. By the end of the ninth century, *gi-* was the most common realization in all OHG dialects, and in late OHG *ge-* had become more and more prevalent. By early MHG *ge-* was the sole realization (Paul 2007: 108). The frequency of the three realizations of *ga-*, *gi-*, and *ge-* depended on the dialect of OHG. For example, *gi-* was first attested in CG (Franconian) dialects of OHG at the beginning of the ninth century.[3]

[1]The other etymological velar in word-initial position is WGmc ⁺[k], including the ⁺[k] after a sibilant in WGmc ⁺[sk]. The evidence discussed below concerns the dating of the fronting of word-initial ⁺[ɣ], but that evidence cannot be extended to the fronting of the fortis velar. The only dialects discovered in which the modern reflex of WGmc ⁺[k] is an opaque palatal at the left edge of a word are EPo (Kreis Konitz; §11.5) and HPr (Reimerswalde; §11.6). Since the sound changes responsible for creating the underlying palatal in those places were specific to those particular dialects, no evidence is available to my knowledge to determine the chronology of velar fronting.

[2]I do not discuss other (dialect-specific) sound changes that led to the development of opaque palatals in word-initial position because the dating of those changes is not as well-established, e.g. r-Deletion in Reinhausen (§7.2).

[3]The scholarly literature on the realization of the *ge-* prefix in early Gmc is vast; some of those studies are cited in the standard reference grammar of OHG (Braune 2004: 73–74). I do not attempt to summarize those works here. It needs to be stressed that my treatment concerns

A similar development from [i] to [ə] in the *ge-* prefix can be observed in the earliest stages of LG, namely OSax (800–1150) and MLG (1150–1600). Given the paucity of textual evidence from OSax, not as much is known concerning the progression from *gi-* to *ge-* in specific OSax dialects as in OHG varieties (see King 1965 for some discussion on OSax). The most significant generalization is that in OSax the two most common realizations of the prefix in question were *gi-* and *ge-*, where the former was far more common than the latter (Holthausen 1900: 42). The transition from *gi-* to *ge-* appears to have been completed by the onset of MLG (Lasch 1914: 125).

In light of the developments discussed above it can be concluded that the fronting of word-initial WGmc ⁺[ɣ] began when the vowel of the *ge-* prefix was still [i], meaning that velar fronting must have been phonologized before that [i] (/i/) was restructured to schwa (/ə/). The conclusion is that the phonologization of velar fronting in word-initial position began no later than late-OHG/OSax and that the opaque in word-initial position was in place by early MHG/MLG. It is difficult to establish a precise century during OHG/OSax when velar fronting was phonologized, although it can be said with a fair degree of certainty that velar fronting in word-initial position – or after a sonorant (§16.3) – was not inherited from WGmc because one other WGmc language (Dutch) fails to have it.[4]

Table 16.1 summarizes the status of the word-initial palatal deriving historically from WGmc ⁺[ɣ] in HG (CG) and LG respectively. I assume here that the initial palatal in the prefix in the first column is a lenis fricative, although other palatal realizations are possible depending on the dialect, e.g. fortis fricative ([ç]) or stop ([c] or [ɟ] in West Mecklenburg, Sebnitz, and Seifhennersdorf; recall Chapter 11).[5]

itself only with the OHG progenitor of modern-day *ge-* in dialects referred to above where the original velar is now a palatal and the vowel is schwa. The important point is that realizations like [ʝə] only make sense if the vowel of the prefix was once a trigger for velar fronting, e.g. [ɣi].

[4]Sound changes resembling velar fronting occurred independently in other branches of Gmc (NGmc and WGmc). As I point out in Appendix I there are significant differences between those changes (Velar Palatalization) and velar fronting in HG/LG; hence, it could not have been the case that velar fronting was inherited from WGmc.

[5]On occasion, one encounters statements in some of the literature which maintain that velar fronting in StG arose during or shortly after MHG. An examination of those sources reveals that such claims are based solely on speculation. For example, Penzl (1975: 107) asserts that [x] developed a palatal allophone after front vowels and sonorant consonants in Late MHG, but he gives no evidence. Cercignani (1979: 63) uncritically accepts Penzl's claim, which is also adopted in textbooks (Schmidt 2007: 288). Russ (1982: 85) opines that velar fronting "… is probably not very old, since it does not exist in all German dialects …".

Table 16.1: Chronology of word-initial velar fronting of WGmc +[ɣ] in CG (a) and LG (b)

	Realization of *ge-*	Time frame	Status of palatal from WGmc +[ɣ]:
a.	[ʝi] (from /ɣi/)	ca. 750–1000	Allophone
	[ʝə] (from /ʝə/)	after ca. 1000	Palatal quasi-phoneme
b.	[ʝi] (from /ɣi/)	ca. 800–1150	Allophone
	[ʝə] (from /ʝə/)	after ca. 1200	Palatal quasi-phoneme

The palatal allophone referred to in Table 16.1 ([ʝ]) and corresponding velar ([ɣ]) were in complementary distribution. This implies that the etymological glide (WGmc +[j]) was still realized as a glide and that Glide Hardening (§4.2) had not yet been phonologized; recall the case studies discussed in Chapter 8. Hall (2014b) discusses the chronology of Glide Hardening in LG at length, since that change was an important component of the development from glide ([j]) to lenis velar fricative ([ɣ]) after short vowels, traditionally referred to as Schärfung. Hall's conclusion is that Glide Hardening must have been active in OSax because the change from [j] to [ɣ] was completed by the end of the OSax era.

The chronology of the fronting of word-initial WGmc +[ɣ] as summarized in Table 16.1 only holds for those dialects listed above in which the modern reflex of that historical velar is palatal before front vowels or before schwa but velar before full back vowels. In some dialects WGmc +[ɣ] is realized in word-initial position as palatal before front vowels and velar before all back vowels, including schwa (e.g. Soest, §4.3). In a very common pattern exemplified primarily by CG dialects, WGmc +[ɣ] is realized as palatal in word-initial position before any sound (recall Stage 2e dialects discussed in Chapter 14). The Soest pattern was argued in §7.4 to involve the same chronology as the one depicted in Table 16.1. On the basis of the rule generalization model, the extension of velar fronting triggers to the broadest context (word-initially before all sounds) must have postdated the change from velar to palatal before all and only front vowels in Table 16.1.

A number of commentators have noted that there is strong orthographic evidence from earlier stages of German that WGmc +[ɣ] had a palatal variant before front vowels. That evidence is significant because it lends independent support to the chronology proposed above. I only present a brief overview of the philological facts here since they are discussed in much greater detail in Van der Hoek (2010) and references cited therein. The philological evidence is strongest in OSax: In that language the letter used to represent WGmc +[j] was the same as the let-

ter used for WGmc +[ɣ], e.g. *giung* (<WGmc +[juŋg] ‘young’). Likewise when WGmc +[ɣ] appeared before *i* or *e*, it is not unusual to find a spelling *i* or *hi* (or zero), e.g. *ieldan* (cf. *geldan* ‘pay-INF’). Philological evidence for the fronting of word-initial WGmc +[ɣ] in OHG is scanty, although those facts hold for northern (Franconian) dialects which were presumably the progenitor of the CG dialects referred to in Table 16.1(a). In those OHG dialects the letter representing WGmc +[ɣ] is *j* before front vowels, e.g. Rpn *iechose*, which is apparently a proper name.

16.3 Postsonorant position

The dating of velar fronting in word-initial position was established on the basis of the chronology of a sound change creating opaque palatals (Vowel Reduction). A number of changes were discussed earlier (Chapter 7 and Chapter 9) that produced opaque palatals in postsonorant position, but unlike Vowel Reduction, most of those changes were dialect-specific and not pan-German developments. Since no historical evidence is known to me on the dating of those sound changes (r-Retraction, Vowel Retraction, Syncope), I do not discuss them and leave this issue open for further research provided data becomes available. One might hope that Vowel Reduction could provide clues on the dating of postsonorant velar fronting, but only a very small number of dialects discussed earlier have opaque palatals created by that change. One example (Wermelskirchen in §7.3) is the word [iːvəç] (/iːvəç/) ‘eternal’ (cf.OHG *ēwīg* and StG [eːvɪç] with the unreduced front vowel [ɪ]). That item from Wermelskirchen suggests that velar fronting was phonologized before Vowel Reduction, but Vowel Reduction could have postdated OHG in that type of word because it was specific to a particular CG dialect.

Two reliable linguistic arguments can be adduced for the dating of velar fronting in postsonorant position. The first of those arguments comes from the findings from §14.7: If velar fronting is attested in word-initial position then the same process is also present in postsonorant position in the same dialect for the same target segment. That implication is exceptionless in the present survey of German dialects. The reason for the absence of dialects with velar fronting in word-initial position but no fronting in postsonorant position was attributed to history: Velar fronting began in postsonorant position and then spread geographically to such a degree that an extension of velar fronting to word-initial position was only possible if that dialect already had postsonorant velar fronting.

The consequence of the findings from §14.7 is that the fronting of WGmc +[ɣ] in postsonorant position must have already been phonologized in the dialects

discussed in §16.2 (summarized in Table 16.1) prior to the phonologization of the fronting of WGmc ⁺[ɣ] in word-initial position. Recall that the type of dialect referred to here was particularly prevalent in LG, i.e. Eph (Dorste, §4.4; Eilsdorf, §8.3; Dingelstedt am Huy, §8.4), Wph (Elspe and Schieder-Schwalenberg, §7.2). The generous time frame for HG and LG in Table 16.1 leaves plenty of breathing room for velar fronting in both contexts: Postsonorant fronting of WGmc ⁺[ɣ] may have been phonologized at the beginning of the ninth century and then spread geographically over the next hundred years at which point the change was extended to word-initial position.

The second linguistic argument for establishing a time frame for the phonologization of postsonorant velar fronting pertains to the fortis fricative [x]. Recall that postsonorant [x] has two main progenitors, namely WGmc ⁺[x] (for HG and LG) and WGmc ⁺[k] (for HG). The challenge in this case is clear: The velar and palatal reflexes of [x] are both spelled the same way in the earliest attested HG and LG branches (cf. StG *ch* for [x] and [ç]). Hence, there is no philological evidence telling us when *ch* first started being realized as palatal after front vowels. However, linguistic evidence can prove beneficial. Recall from §2.3 and §12.8.2 the following exceptionless implication:

(1) Implicational Universal for Velar Fronting Targets-2:
If a lenis sound undergoes velar fronting then the corresponding fortis sound does as well.

That implication accounts for the synchronic fact that there are dialects in which the targets for velar fronting are fortis (/x/) and lenis (/ɣ/) sounds (Target Type M/Stage 2bb), or fortis (/x/) but not lenis (Target Type L/Stage 2aa). Significantly, there is no dialect where a lenis velar (/ɣ/) undergoes fronting but the corresponding fortis sound (/x/) does not.

(1) can tell us something about when the fronting of postsonorant [x] was phonologized, although that evidence only holds for certain dialects. Consider the many Target Type M dialects referred to in Chapter 12 which have no velar fronting in word-initial position. In that type of system it can be concluded that postsonorant velar fronting was phonologized first with the /x/ target and that the change only later extended to /ɣ/. However, no conclusions can be drawn concerning when the postsonorant fronting of /x/ was phonologized. More revealing are Stage 2bb dialects with velar fronting in word-initial position. Representative examples were mentioned above, namely LG, i.e. Eph (Dorste, Eilsdorf, Dingelstedt am Huy) and Wph (Elspe, Schieder-Schwalenberg), as well as LG and CG varieties spoken in the northeast of pre-1945 Germany. In those places it

can be deduced that word-initial WGmc $^{+}$[ɣ] was fronted allophonically during OHG/OSax and that the fronting of /ɣ/ (from WGmc $^{+}$[ɣ]) in postsonorant position had been phonologized before then. Significantly, it can also be concluded on the basis of (1) that the fronting of postsonorant [x] (< WGmc $^{+}$[x]/$^{+}$[k]) had been phonologized even before the fronting of postsonorant [ɣ] (< WGmc $^{+}$[ɣ]).

The conclusions concerning the general time frame for velar fronting are summarized in (2):

(2)
a. In many LG (and some CG) varieties, the fronting of WGmc $^{+}$[ɣ] must have been phonologized in word-initial position in OHG/OSax; see Table 16.1. In those same dialects, the allophonic palatal had become an underlying (opaque) palatal by early MHG/MLG;
b. In the dialects referred to in (2a), the fronting of /ɣ/ (< WGmc $^{+}$[ɣ]) must have been phonologized in postsonorant position even before it was phonologized in word-initial position;
c. In the dialects referred to in (2b) the fronting of /x/ (< WGmc $^{+}$[x]/$^{+}$[k]) must have been phonologized in postsonorant position even before the fronting of /ɣ/ (< WGmc $^{+}$[ɣ]) in postsonorant position.

16.4 Remarks on geography

It was noted in Chapter 12 and Chapter 14 that the areal distribution for the various velar fronting patterns appears somewhat haphazard and does not always give a clear indication of whether or not there are (or were) isoglosses separating the postulated historical stages. Nevertheless, the material on German dialects discussed in previous chapters does give some clues concerning the relative age of velar fronting in certain areas with respect to others.

One point needs to be stressed at the outset: The presence of velar fronting islands only makes sense if velar fronting had more than place of origin. Few definitive conclusions can be reached on the focal area(s) for velar fronting in Germany and Austria. On the one hand, one could adopt monogenesis and claim that there was only one original place where velar fronting was phonologized. On the other hand, since velar fronting islands are well-attested in Switzerland/Tyrol among other places (Chapter 15), there is no principled reason why polygenesis could not be correct for Germany.

That point aside, there is agreement in the literature that sound change begins in a focal area and then spreads both temporally and geographically from that point of origin (§2.4.1 and §16.6 below). Spreading can involve more than one

factor, but the two that are most significant for velar fronting are the triggers and/or targets, which gradually expand in the focal area to include more and more segments. The original change in the focal area also spreads geographically in the sense that outlying areas adopt it. Significantly, the change is active the longest in the focal area, and it is there where it reaches its most general form in terms of the number of triggers/targets. However, in some of the outermost areas the change never progresses to the more general contexts in the focal area. The important point is that the focal area for velar fronting – the place where that process is phonologized – is that place where the set of triggers/targets is most general.

On the basis of the various velar fronting patterns discussed in previous chapters, one generalization is that velar fronting must be quite old in CG varieties of OHG but much more recent in LG (OSax). Map 16.1 indicates the major dialect areas of OHG and OSax referred to here. Consider the following four pieces of evidence.[6]

(A) In postsonorant position those CG/LG varieties with a narrow set of triggers are not common. By contrast, WCG (Rpn, MFr) has the broad set of triggers (coronal sonorants) without exception (Table 12.9). The narrow triggers in those LG (Wph) places and the broad triggers in WCG (Rpn, MFr) make sense if velar fronting in postsonorant position was present longer in WCG (Rpn, MFr) than in LG (Wph).

(B) In postsonorant position, LG (Wph) dialects have a strong preference for a narrow set of targets (/x/ but not /ɣ/; Stage 2aa=Target Type L), but the more inclusive set of targets (/x/ and /ɣ/; Stage 2bb=Target Type M) are more prevalent in WCG (Rpn, MFr). In fact, no Stage 2aa dialect was found among Rpn/MFr dialects in the survey given in Chapter 12. Compare Table 12.15 for Wph with Table 12.9 for Rpn/MFr.

(C) In word-initial position, LG (Wph, Eph) dialects are well-attested with a narrow set of triggers (Table 12.16 for Wph and Table 12.18 for Eph). By contrast, velar fronting in many WCG varieties (e.g. Rpn) exhibits the broadest possible set of triggers (Stage 2e); see Table 14.2. Recall that Stage 2e is the change from velar to palatal as a nonassimilatory change. The dichotomy between broad vs. narrow triggers in word-initial position suggests that velar fronting has been present longer in WCG (Rpn) and is of more recent origin in LG (Wph, Eph).

[6]A fifth difference between the two dialects is alveolopalatalization, which is well-attested in CG but not in LG. I do not consider alveolopalatalization because that change began much later than OHG/OSax; recall the discussion in §10.6.1.

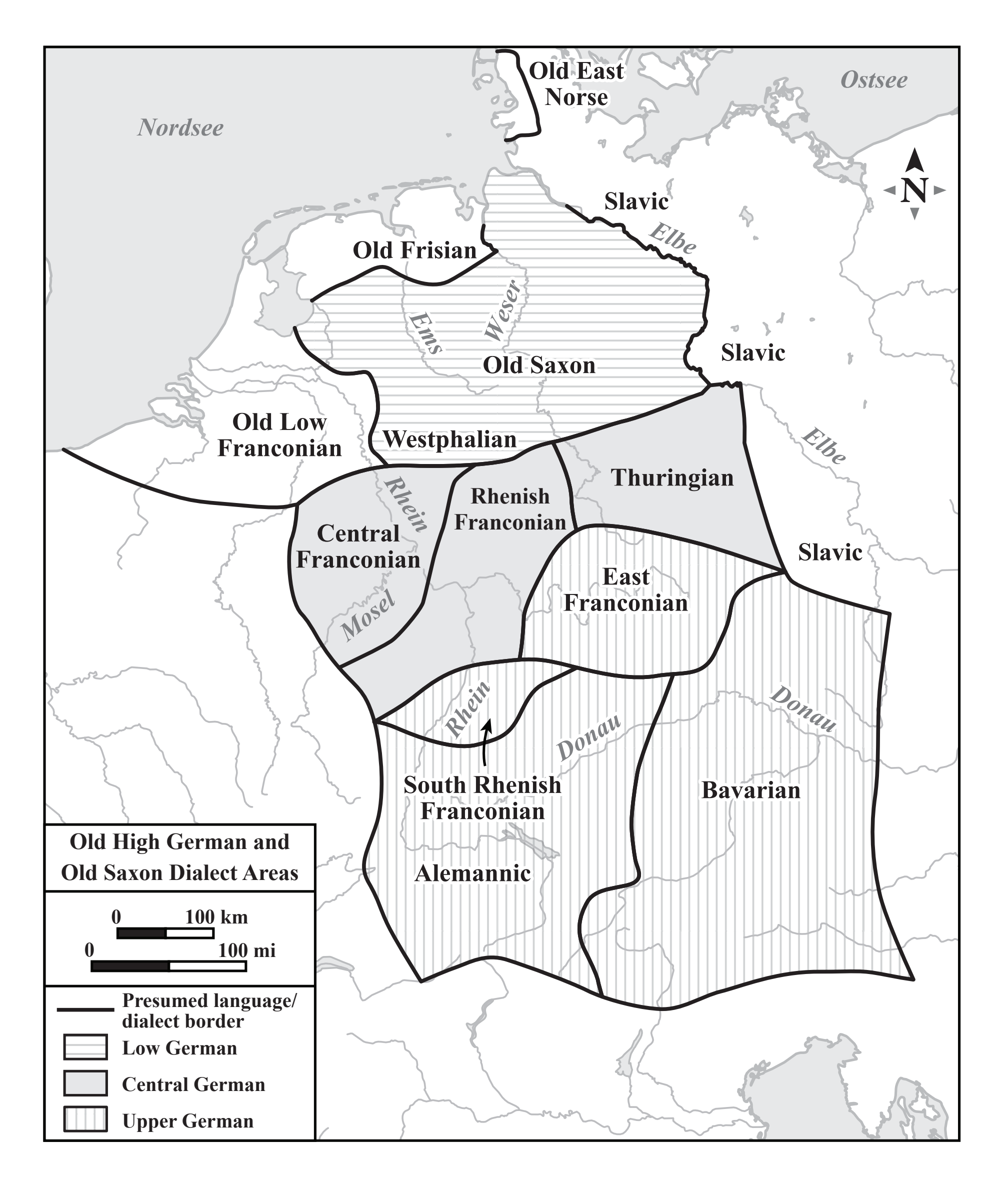
(D) Within the Wph dialect continuum certain communities can be identified in relatively close proximity which represent the incremental assimilatory stages for velar fronting triggers in word-initial and postsonorant position; recall the discussion of Wph in §12.5.2. The significance of those Wph places is that they point to a region where velar fronting was phonologized relatively late (in contrast to other areas). In particular, the focal area for the change was not in the Wph region. Instead, that change was phonologized elsewhere and then spread geographically from that focal area to the Wph region thereby leaving relics in the modern era.

On the basis of (A)-(C) it can be concluded that velar fronting has been active for a long time in many varieties of WCG, but the status of velar fronting in UG varieties of OHG is not as clear. The shift of WGmc ⁺[ɣ] to palatal in word-initial position did not occur in UG because that original fricative was restructured to [g] (/g/), which was not a velar fronting target. And since the change from WGmc ⁺[ɣ] to [g] also occurred in postsonorant position in UG, it is difficult to find UG varieties in which the target for postsonorant velar fronting is anything other than /x/; hence, UG is not one of the dialects referred to in (2). No conclusions at all can be drawn concerning when /x/ first developed a palatal allophone in UG, although the data discussed for Lower Bavaria from SNiB points to a fairly recent date (§13.4).[7]

16.5 Directionality revisited

The typological literature on Velar Palatalization makes extensive reference to a directionality parameter (§2.3.5). Recall that directionality is not an issue for velar fronting in German dialects because postsonorant velar fronting always applies from left-to-right (progressively), cf. StG [ku:xən] 'cake' vs. [kʏçə] 'kitchen'. Since the vowel to the right of the target is schwa, speakers do not have the option of applying velar fronting regressively. However, in the velar fronting island of Visperterminen (§6.2) the rule creating schwa (Vowel Reduction) never occurred; hence, there are many native words (or assimilated loanwords) in which a potential velar fronting trigger is to the right of a target (e.g. [xuxxi] 'kitchen').

[7] Conclusions concerning the status of NLG are also tentative. In contrast to Wph/Eph, NLG exhibits the broadest possible set of triggers for assimilatory fronting in postsonorant position (Table 12.14). That table also reveals that the prevalent pattern for NLG is that velar fronting has a broad set of targets (Stage 2bb=Target Type M). It is conceivable that there was also a focal area for velar fronting for NLG varieties of OSax, but since this topic is purely speculative I do not pursue it further.



Map 16.1: Continental West Germanic languages (ca. ninth century). Adapted from Meineke & Schwerdt (2001: 209).

The conclusion is that when velar fronting was phonologized in Visperterminen speakers had a choice between two directions and that – for whatever reason – they opted for the one direction and not the other.

Visperterminen is not unique. Since Vowel Reduction affected any unstressed full vowel, there must have been many words in OHG/OSax with a velar fronting target (/x/) situated between a (stressed) back vowel and an (unstressed) front vowel, i.e. words containing sequences like [ɑxi], [ɑxe] etc. If so, could velar fronting have been phonologized as a regressive assimilation in some dialects of OHG/OSax? In the remainder of this section I argue that the answer must have been negative and that when velar fronting was phonologized it applied progressively in every variety.

To illustrate this point, consider the items from OHG in the first column of (3). These OHG examples consist of a partial paradigm for a verb in (3a), a noun in (3b), and an adjective in (3c). The verb, noun, and adjective presented here have in common that the bare stem ends in [x] and that at least one of the inflectional suffixes begin with a front vowel.

(3)		OHG	Stage A	Stage B	
	a.	suochu [suoxu]	[suoxu]	[zuːxə]	'seek-1SG'
		suochis [suoxis]	[suoçis]	[zuːçst]	'seek-2SG'
		suochit [suoxit]	[suoçit]	[zuːçt]	'seek-3SG'
	b.	bah [bɑx]	[bɑx]	[bɑx]	'stream'
		bahes [bɑxes]	[bɑçes]	[bɑçəs]	'stream-GEN.SG'
	c.	hōh [hoːx]	[hoːx]	[hoːx]	'high'
		hōhēr [hoːxeːr]	[hoːçeːr]	[hoːçɐ]	'high-MASC.SG'
		hōhiu [hoːxiu]	[hoːçiu]	[hoːçə]	'high-FEM.SG'

The interesting examples are the ones in the first column with front vowels in the suffix. If there had been OHG dialects in which velar fronting was phonologized as a rule spreading the frontness feature from right-to-left (regressively), then those early dialects must have been realized phonetically as in the Stage A column above. If the inflectional suffixes underwent the same changes as in StG (Vowel Reduction, Syncope, r-Vocalization), then Stage A could have conceivably developed into Stage B.

No dialect in the present survey has anything resembling Stage B. Although that hypothetical dataset has a contrast between [x] and [ç] after a back vowel, Stage B is nothing at all like the dialects discussed in Chapter 9 with phonemic palatals. The focus of that chapter was on dialects with a contrast between [x] and [ç] after a back vowel, where the back vowel *before* [ç] was historically front,

e.g. minimal pairs in Wissenbach (§9.2) like [dɑx] 'roof' (cf. StG *Dach*) vs. [dɑç] 'dike' (cf. StG *Deich*). Recall that velar fronting is still active in dialects like Wissenbach to account for regular [x]~[ç] alternations in morphological paradigms. But Stage B in (3) represents an entirely different type of system than the one discussed in Chapter 9 because it contains many stems with [x]~[ç] alternations after back vowels. From the synchronic perspective Stage B requires a rule fronting /x/ to palatal in morphologically-defined contexts, e.g. in the second and third person singular of verbs or in the genitive singular of nouns. In the typological literature on Velar Palatalization referred to throughout the present book, the observation has been made that Palatalization rules can apply in some languages in such morphological contexts. Thus, from the cross-linguistic perspective, Stage B in (3) might be conceivable. However, no dialect investigated in the present book exhibits that pattern.

More than one explanation for the lack of Stage B dialects is possible. Here are two: (a) Stage B is no longer attested in modern dialects, although it was present at an earlier stage. The cells in the Stage B paradigms with [ç] underwent a later analogical change to [x], thereby producing the pattern found in StG, e.g. [zuːçst], [zuːçt] > [zuːxst], [zuːxt]. (b) Stage B is not attested in modern dialects, nor was it ever attested at any earlier stage. The reason for that gap is that velar fronting was phonologized consistently as a progressive assimilation in all German dialects without exception.

Explanation (a) relies on the assumption that there was an analogical change of [ç] to [x], but it cannot account for the fact that every Stage B dialect changed into the familiar StG-type pattern without exception and that there are no relics preserving that Stage B system. Although analogy has undeniably played an important role in the history of German, explanation (a) also cannot account for the fact that stem allomorphy is quite persistent among verbs and nouns in StG as well as German dialects. Thus, explanation (a) begs the question of why [ç] would change the deviant [x] to eliminate stem allomorphy when stem allomorphy is elsewhere so robustly attested?

I contend that the only conceivable reason for the lack of Type B systems is (b). The generalization from §2.3.5 is repeated in (4):

(4) Directionality of Velar Fronting: If a target for velar fronting is situated after a sonorant and before a vowel then the trigger for velar fronting is always the sonorant to the immediate left of that velar sound.

(4) is admittedly little more than a statement of what is true, but it explains nothing. Put differently, why is it that German dialects described from 1860 to

the present in Germany (including the pre-1945 borders) exhibit variation for targets and triggers as well as limited variation concerning outputs, but no variation at all with respect to directionality? One could argue that (4) makes sense if velar fronting were phonologized only once (monogenesis), in which case the progressive direction was simply inherited when than original rule spread outwards from the original focal area. However appealing that explanation might be, it cannot account for velar fronting islands, which phonologized velar fronting with slightly different triggers but with the same progressive direction. Regrettably, the proper explanation for (4) cannot be offered.[8]

16.6 The historical model

In §2.5 I posited a historical model (Figure 2.2), and in Chapters 3–14 I demonstrated in a series of detailed case studies how those data fit into the various stages proposed in the model. The point of this section is to provide a brief summary of the most important patterns involving velar fronting and to demonstrate how they exemplify the model I have proposed.

On the basis of the patterning of velar fronting in HG/LG dialects much can be inferred about the nature of Stage 2 and Stage 3. As noted earlier, Stage 1 has not been taken into consideration because the original sources for velar fronting do not provide the necessary data (e.g. the degree to which [x] is gradiently fronted based on the nature of the adjacent vocoid). I make first a few speculative remarks on the nature of Stage 1, especially in light of the claims I advanced in the earlier part of this chapter on the time frame for the phonologization of velar fronting. The bulk of this section is devoted to a discussion of Stage 2 and Stage 3.

16.6.1 Stage 1

This is the point at which the phonological rule of velar fronting is absent. Stage 1 is therefore represented by any language where velar sounds do not undergo a categorical fronting in the context of front sounds.

[8] One might attempt to argue that velar fronting was phonologized consistently in the left-to-right direction because other rules active in German dialects at that time also involved the progressive spreading of a feature. This is an appealing idea; however, it is counterexemplified by the most well-known rule of OHG/OSax, namely i-Umlaut, which spreads the features of frontness and height from /i/ to the left, e.g. OHG [gɑst] 'guest' vs. [gesti] 'guest-PL'. A brief glance at the sound changes for OHG in Braune (2004) does not reveal any clear candidates for regular progressive spreadings.

The nature of Stage 1 needs to be further refined in light of the findings presented in the preceding chapters. First, velar fronting involves left-to-right (progressive) spreading in every HG/LG variety that has that process (§16.5). Second, when velar fronting phonologizes at Stage 2, the target for that change is the fortis fricative /x/, and the triggers are high front vowels like /i/. These three properties together mean that Stage 1 in the context of the present book can be defined specifically as any dialect/language which possesses sequences like /ix/ ([ix]), where the velar does not undergo categorical fronting. An example of a modern Gmc language that can be classified as Stage 1 is Dutch.

As noted earlier, it is common for velars to be articulated in a slightly more forward position along the palate in the neighborhood of front vowels than in the neighborhood of back vowels. However, this is the coarticulatory (phonetic) fronting of velars and not the categorical change characterized by velar fronting. It has been stressed throughout this book that velar fronting is phonological and not phonetic; hence, the Stage 1 languages under discussion may have the coarticulatory fronting of /x/ after /i/.[9]

In the preceding chapters I have documented a number of Stage 1 LG/HG varieties. Many of those lects are located along the Dutch border, but a surprising finding in the present book is that non-velar fronting islands are attested as well, e.g. Kreis Stolp (Map 11.2).

I claim that there was an earlier point in the history of Gmc (Stage 1) when the phonological rule of velar fronting was not present. Since velar fronting was phonologized at an early stage (OHG/OSax), I conjecture that Stage 1 was represented by the WGmc language.

16.6.2 Stage 2

I hypothesize that the earliest stages of OHG/OSax were characterized by Stage 1 coarticulatory fronting of /x/ in the context after /i/. At Stage 2 (also OHG/OSax) that gradient phonetic process was phonologized. Put differently, at Stage 2 the difference between phonetically fronted /x/ in the context after /i/ and back /x/ in the context of vowels like /u/ at Stage 1 was exaggerated to the point where speakers perceived of the two articulations as different sounds: Palatal [ç] and velar [x]. The phonologization of velar fronting occurred sometime during the time frame discussed earlier in this chapter for OHG/OSax.

Stage 2 was characterized by the reinterpretation by the younger generation of the gradient coarticulatory fronting from Stage 1 of the older generation as

[9] Recall from §12.9.2 that several sources for UG varieties suggest that there is coarticulatory fronting of velars like /x/ in the context after /i/.

a categorical process relating two distinct articulations. Thus, the change from Stage 1 to Stage 2 was intergenerational.

Since velars and palatals did not contrast at Stage 2, those segments stood in an allophonic relationship: [ç] and [x] were associated with one phoneme (/x/), whose realization as palatal was expressed formally with a specific version of velar fronting. That rule spread the feature [coronal] from a high front vowel to a following /i/, thereby producing [ç]. Hence, phonologization (Stage 2) involved the addition of a phonological rule into the Phonology component depicted in Table 2.1. Once in the grammar that synchronic process remained active until it was modified in light of the various changes involving triggers and targets discussed below.

The change from Stage 1 to Stage 2 is depicted in Table 16.2. Stage 2 is given as Stage 2a because it was defined in terms of a narrow set of triggers, as described below. I give sample underlying and phonetic representations in the second column. Note that the underlying representations for Stage 1 are acquired without change by the following generations of speakers (Stage 2a).[10]

Table 16.2: Change from Stage 1 to Stage 2a

Stage	Underlying and phonetic representations	Triggers for velar fronting
1	/ix/ [ix], /ex/ [ex] /ɑx/ [ɑx]	No rule
2a	/ix/ [iç], /ex/ [ex] /ɑx/ [ɑx]	/i/

In the intergenerational, listener-based approach described in §2.5, Stage 1 and Stage 2a represent a speaker and a listener respectively. The former utters a word containing [ix] – where the fricative shows the effects of coarticulatory fronting ([x̟]), – but the listener acquiring the language misperceives that prevelar as palatal. The change from Stage 1 (speaker) to Stage 2a (listener) involves not only the emergence of a new pronunciation ([ç]), but also the interpretation of that new sound as a phonological unit. The listener does this by relating the new palatal ([ç]) with the other dorsal fricative ([x]) as allophones, whose distribution is expressed with the newly acquired rule of velar fronting.

[10]In the case studies discussed above a total of fourteen versions for postsonorant velar fronting are posited (Appendix D). The set of narrow triggers at Stage 2a in Table 16.2 therefore suggests that the correct version of velar fronting is Vel-Fr-6, discussed in §6.2.2. In the remainder of this section I continue to discuss the expansion of triggers in the rule generalization model in terms of segments (/i/, /e/ etc.), but these generalizations can easily be translated into one of the formal rules posited earlier.

As stressed throughout this book, velar fronting was phonologized in more than one place. A moment's reflection reveals that this scenario also implies a temporal dimension. Imagine the younger generation of speakers in a particular place (P_1) acquiring the rule of velar fronting at Stage 2a at a particular point in time (T_1). If phonologization happens in a different place (P_2), and if there is no contact between speakers of P_1 and P_2 because they are separated by hundreds of kilometers then it is unlikely that velar fronting in P_2 is also phonologized precisely at T_1. What this suggests is that the phonologization of velar fronting began in certain places during OHG/OSax but that the process of phonologization in other places (P_2, P_2 …) must have continued on into the future as well (e.g. MHG/MLG).

I describe now how rule generalization occurred with the rule of velar fronting as it was originally phonologized (Table 16.2).

When velar fronting made the jump from Stage 1 to Stage 2a it affected only a single velar segment (/x/), it was triggered by a narrow set of triggers (/i/), and the output was palatal ([ç]). What is more, velar fronting was phonologized as a progressive assimilation meaning that the trigger was to the immediate left of the target.

The gradual expansion of targets and triggers is depicted abstractly for targets and triggers in Figure 2.1. In Figure 16.1 I modify Figure 2.1 in order to show how the set of triggers expanded in time and space for velar fronting. The three Trigger Types depicted here were defined in Table 14.1. Recall from that table that there are a number of other stages which correspond to expanded sets of triggers. I focus here only on three stages indicated below, although the same principles hold for the additional stages.

In Figure 16.1 I compare three contexts for velar fronting, namely after all high front vowels (represented by /i/), after all nonlow front vowels (represented by /i/, /e/), and after all front vowels (represented by /i/, /e/, /æ/). Low front vowels (/æ æː/) were phonemicized by the onset of MHG/MLG (ca. 1050). Recall that many modern LG/HG dialects possess at least one low front vowel.

Consider first column A, which illustrates how velar fronting (Vel Fr) spread temporally: Phonologization occurred in a particular place (P_1) for the target (/x/) and the narrow trigger (/i/). Stage 2a is depicted with the white square. At some later point in time (Stage 2b), Vel Fr generalized in P_1 to include all high front and mid front vowels (/i/, /e/), which is depicted with the gray square. Next, Vel Fr was generalized in P_1 further at a later period in time (Stage 2c') by applying after all front vowels (/i/, /e/, /æ/). This point is illustrated with the black square.

The rule generalization model means that varieties of HG/LG where Vel Fr applies after all front vowels were preceded by a stage in which the triggers were

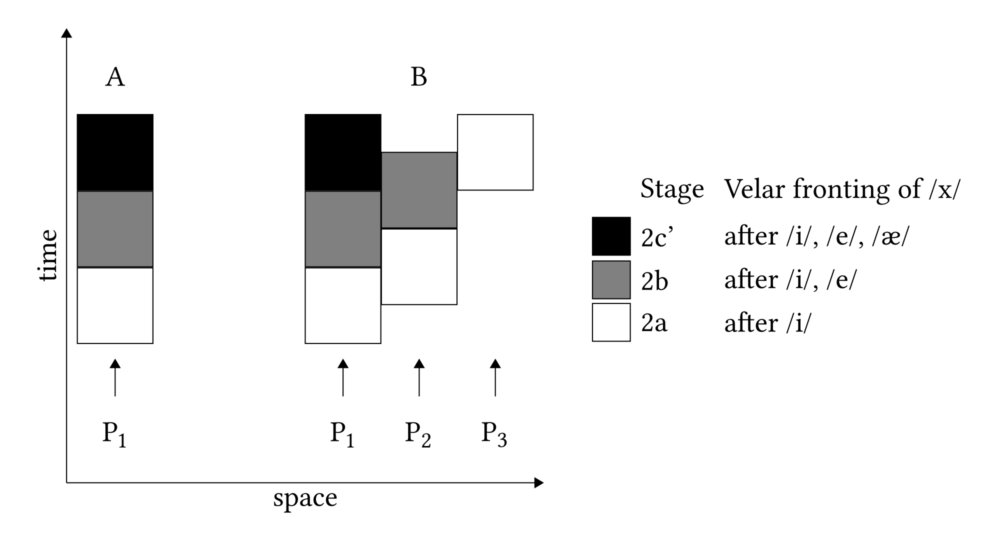


Figure 16.1: Rule generalization in time and space for velar fronting with three Trigger Types

nonlow front vowels, which was preceded by a stage when the triggers were the high front vowels. It is not possible to provide direct evidence for this type of temporal spread because it would require a description of a dialect spoken at a particular place (P) at a particular time (T) and another description of the same variety spoken in P at a time earlier or later than T. Although that type of direct evidence is lacking, there is indirect evidence for the progression of triggers as depicted in Figure 16.1. See in particular Chapter 13 and Map 13.3, which document places throughout Lower Bavaria which represent the three historical stages depicted in Figure 16.1.

According to the rule generalization model the addition of triggers and targets proceeds not only temporally (column A of Figure 16.1), but also in terms of space (column B). As shown under column B, Vel Fr was phonologized in P_1 for the target /x/ and the trigger /i/, defined as Stage 2a and depicted with a white square, and at a later point in time Vel Fr generalized its triggers to attain Stage 2b in P_1 (gray square). At some point when Vel Fr was active at Stage 2a in P_1, Vel Fr also spread geographically to P_2. When Vel Fr was phonologized in P_2 its triggers were defined narrowly as Stage 2a (white square). At the top of column B it can be seen that Vel Fr was generalized further in P_1 to attain Stage 2c’ (black square) and that Vel Fr also spread temporally to P_2 by attaining the targets and/or triggers representing Stage 2b (gray square). At some point Vel Fr was then phonologized with the narrow set of triggers (white square) in a third place (P_3).

The gradual increase in the number of triggers meant that each stage resulted in a modification of the rule of velar fronting that was active for that synchronic stage. When a new stage was attained, the younger generation reanalyzed the earlier rule by generalizing the number of triggers. For example, speakers at Stage 2a had underlying and phonetic representations like the ones in Table 16.3 with a rule of velar fronting applying only after high front vowels. The younger generation (Stage 2b) inherited the same underlying generations, but then extended the rule so that it applied after all and only nonlow front vowels. The next generation (Stage 2c') consequently inherited the same underlying representations from Stage 2b, but then generalized the context of the rule (after all front vowels) and therefore the /x/ in sequences like /ix/, /ex/, /æx/ (but not the /x/ in /ɑx/) was realized as [ç].

Table 16.3: Change from Stage 2a to Stage 2b to Stage 2c'

Stage	Underlying and phonetic representations	Triggers for velar fronting
2a	/ix/ [iç], /ex/ [ex], /æx/ [æx], /ɑx/ [ɑx]	/i/
2b	/ix/ [iç], /ex/ [eç], /æx/ [æx], /ɑx/ [ɑx]	/i/, /e/
2c'	/ix/ [iç], /ex/ [eç], /æx/ [æç], /ɑx/ [ɑx]	/i/, /e/, /æ/

Each of the three stages in Table 16.3 represents a slightly different synchronic system. That point is expressed in the final column, which lists the triggers that need to be expressed formally in the synchronic rule of velar fronting for that stage. For example, the Stage 2a rule spreads [coronal] from a [+high] segment to /x/, but the next generation of speakers who expand the set of targets to the one for Stage 2b have a rule spreading [coronal] from a [−low] sound to /x/. The next generation of speakers then acquires a rule spreading [coronal] from all front vowels to /x/.

Figure 16.1 depicts the expansion of triggers for postsonorant velar fronting with /x/ as the sole target segment. Velar fronting also involved a gradual expansion of target segments. Thus, the first velar to serve as target was /x/, the second was /ɣ/, and the third was the set of noncontinuants (/k g ŋ/). Table 16.4 lists underlying and phonetic representations for sequences consisting of a high front vowel (/i/) followed by the fortis velar fricative (/x/), the corresponding lenis (/ɣ/) and the three velar noncontinuants (/k/, /g/, /ŋ/). It can be seen in the second column below that velar fronting is phonologized at Stage 2aa because that is the stage in which /x/ is the sole target segment. At Stage 2bb the target consists of all and only velar fricatives, and at Stage 2cc of all velar consonants.

Table 16.4: Change from Stage 2aa to Stage 2bb to Stage 2cc

Stage	Underlying and phonetic representations	Targets for velar fronting
2aa	/ix/ [iç], /iɣ/ [iɣ], /ik/ [ik], /ig/ [ig], /iŋ/ [iŋ]	/x/
2bb	/ix/ [iç], /iɣ/ [iʝ], /ik/ [ik], /ig/ [ig], /iŋ/ [iŋ]	/x/, /ɣ/
2cc	/ix/ [iç], /iɣ/ [iʝ], /ik/ [ic], /ig/ [iɟ], /iŋ/ [iɲ]	/x/, /ɣ/, /k/, /g/, /ŋ/

The set of target segments for the individual stages is expressed formally with features in the various versions of velar fronting. For example, for speakers representing Stage 2aa velar fronting spreads [coronal] to [+consonantal, −sonorant, +continuant, +fortis, dorsal], but the next generation extends the targets at Stage 2bb to [+consonantal, −sonorant, +continuant, dorsal] and then the later generation at Stage 2cc to [+consonantal, −sonorant, dorsal].

The spread from /x/ to additional target sounds as depicted in Table 16.4 proceeded temporally as well as spatially. Evidence for these three stages comes from HG/LG dialects: Many varieties are attested in which /x/ is the sole trigger, but a number of varieties are attested in the same general areas where the targets are broader (Map 12.4). The broadest set of targets (Stage 2cc) is attested in a small number of dialects spoken in the eastern areas of pre-1945 Germany (Map 11.2).

I have described how the rule generalization model can be applied to the triggers and targets for (postsonorant) velar fronting, but it needs to be stressed that the spread from a narrow to broad set of triggers (Table 16.3) and the spread from a narrow to a broad set of targets (Table 16.4) did not always match up. Put differently, when phonologization occurs, Stage 2a for triggers goes hand in hand with Stage 2aa for targets, but some dialects extend the set of triggers at a faster rate than the set of targets. This point accounts for the fact that many varieties of HG/LG are attested with the narrowest set of targets (/x/) but with the broadest set of triggers (coronal sonorants); see Chapter 12 for examples.

Earlier on in this chapter I discussed the connection between postsonorant velar fronting and word-initial velar fronting. The conclusion (§16.3) is that the former must have preceded the latter. Thus, the phonologization of velar fronting with /x/ as the target and front vowels like /i/ as the triggers and the gradual increase in the number of triggers occurred before word-initial velars succumbed to phonologization.

The word-initial velar which served as the target for velar fronting went through the same stages for triggers and targets as depicted above for postsonorant position. Table 16.5 illustrates the most common pattern for word-initial

velar fronting: At Stage 1, WGmc +/ɣ/ exhibited coarticulatory fronting in word-initial position before /i/. The younger generation of speakers interpreted that fronted velar (Stage 2aa) as a palatal ([ʝ]) and therefore a specific version of word-initial velar fronting was acquired by those speakers. Underlying and phonetic representations are given below. Recall from Table 16.4 that the target for Stage 2aa in postsonorant position is /x/; however, dialects displaying the pattern in Table 16.5 have no /x/ in word-initial position; hence, /ɣ/ is the only dorsal fricative in that context. At Stage 2cc the younger generation of speakers extends the set of targets to include velar stops as well; in the dialects referred to here /k/ is the only noncontinuant in word-initial position.

Table 16.5: Change from Stage 2aa to Stage 2bb to Stage 2cc (word-initial)

Stage	Underlying and phonetic representations	Targets for Velar fronting
1	/ɣi/ [ɣi], /ki/ [ki]	No targets
2aa	/ɣi/ [ʝi], /ki/ [ki]	/ɣ/
2bb	/ɣi/ [ʝi], /ki/ [ci]	/ɣ/, /k/

At Stage 2aa and 2bb the synchronic rule of word-initial velar fronting differs slightly in order to express the target segments. Thus, [coronal] spreads to [+consonantal, −sonorant, +continuant, dorsal] at Stage 2aa and to [+consonantal, −sonorant, dorsal] at Stage 2bb.

At Stage 2 the synchronic rule of velar fronting interacts transparently with synchronic and diachronic rules changing those targets and triggers. This means that velar fronting could be fed or bled by another rule (synchronically or diachronically); recall Figure 2.5. This transparent relationship holds during the expansion of targets and triggers as described above; see (5). The underlying and phonetic representations here do not depict specific words, but instead entire classes of words. /i/ represents high front vowels, /e/ mid front vowels, and /eɑ/ a diphthong ending in a back vowel.

(5)	a.		/iɣ/	/iɣ-ə/	/ix/	b.	/ix/	/ex/	>	/ix/	/eɑx/
		Fnl Fort	ix	-----	----		[iç]	[eç]		[iç]	[eɑx]
		Vel Fr	iç	-----	iç						
			[iç]	[iɣə]	[iç]						

(5a) illustrates the most common synchronic feeding relationship. In that type of system (e.g. Soest, §4.3), there are two phonemic velar fricatives (/x/, /ɣ/), but

only the fortis fricative /x/ serves as a target for velar fronting; hence, the synchronic rule of velar fronting illustrates Stage 2aa for targets. As shown in (5a), Final Fortition (Fnl Fort) feeds velar fronting (Vel Fr). This example shows that the target for velar fronting could be either an underlying fortis velar fricative or a fortis velar fricative derived by Final Fortition. In this example regular morphophonemic alternations of the type [x]~[ɣ] imply that Final Fortition is synchronically active.

(5b) depicts a bleeding relationship. The two examples to the left of the wedge show that velar fronting is active as a synchronic rule at Stage 2. At a later point (to the right of the wedge) a sound change replaces a front vowel with a diphthong ending in a back vowel. Since there are no alternations between [e] and [eɑ] that change is diachronic, meaning that it restructures underlying representations. Significantly, after the change from /e/ to /eɑ/ the /x/ in /eɑx/ surfaces as velar [x] and not as palatal [ç] because the second part of the diphthong /eɑ/ is not a trigger for velar fronting. In this example the change from /e/ to /eɑ/ bleeds velar fronting. The historical bleeding relationship discussed here is well attested in many varieties of HG and LG.

16.6.3 Stage 3

The transparent relationship between velar fronting and other processes described above for Stage 2 can change into an opaque relationship. Stage 3 is the cover term for velar fronting when velar fronting is opaque. Two types of opacity are attested: (a) some velars surface unexpectedly as velars in the context of velar fronting (underapplication); or (b) some palatals deriving historically from velars occur unexpectedly in the back vowel context (overapplication).

As discussed in Chapters 5–11, underapplication and overapplication are each manifested in two ways. For underapplication, the two options are: (aa) velar fronting is counterfed synchronically by another process, or (ab) neutral vowels emerge. For overapplication the two historical paths are: (ba) the emergence of palatal quasi-phonemes, or (bb) the emergence of phonemic palatals that contrast with velars. In all four cases the change from Stage 2 to Stage 3 is intergenerational; hence, the older generation has velar fronting, which interacts transparently with other rules, and the younger generation acquires the opaque forms.

I consider the four scenarios described above in order:

(aa): In this system there is a synchronic rule (Rule X) that creates new target segments which can potentially undergo velar fronting. Since those new velars fail to undergo that process, velar fronting is counterfed by Rule

X. In the case studies exemplifying (aa) discussed in Chapter 5 both velar fronting and Rule X are active synchronically. In (6) I focus on a dialect in which Rule X is Final Fortition. Stage 3 is depicted to the right of the wedge in (6). That opaque system is the outgrowth of the transparent system in (5), repeated in (6) to the left of the wedge.

(6)		Stage 2		>			Stage 3	
	/iɣ/	/iɣ-ə/	/ix/			/iɣ/	/iɣ-ə/	/ix/
Fnl Fort	ix	-----	----		Vel Fr	----	----	iç
Vel Fr	iç	-----	iç		Fnl Fort	ix	----	----
	[iç]	[iɣə]	[iç]			[ix]	[iɣə]	[iç]

Sequences like [ix] at Stage 3 illustrate underapplication opacity because Final Fortition counterfeeds velar fronting.

(ab): In this scenario a historical process (Rule Y) creates new front vowels which can potentially serve as triggers for velar fronting. Since those new front vowels fail to induce velar fronting, the latter process is counterfed historically by Rule Y. In the case studies discussed in Chapter 6 illustrating (ab), Rule Y is no longer active synchronically. Instead, it restructures underlying representations for a younger generation of speakers. The emergence of the neutral vowel /øix/ at Stage 3 is illustrated in (7). The non-neutral vowel /ei/ is included for comparison.

(7)	Stage 1			Stage 2			Stage 3	
	/oux/	/eix/	>	/oux/	/eix/	>	/øix/	/eix/
	[oux]	[eix]		[oux]	[eiç]		[øix]	[eiç]

The important point is that surface sequences like [øix] illustrate underapplication opacity. From the synchronic perspective, velar fronting at Stage 2 is inherited by Stage 3 speakers, but those speakers also acquire the unique representation for neutral vowels whereby the /i/ in /øi/ is no longer [coronal].

(ba): In this type of dialect a historical process (Rule Z) eliminates triggers for velar fronting, but that change fails to bleed velar fronting. An example of Rule Z is the change from a front vowel to schwa (/ə/) in an unstressed syllable (Vowel Reduction). In (8) I illustrate a system that is common (Chapter 7). At Stage 2 velar fronting is active in word-initial position.

When Vowel Reduction changes unstressed vowels – including crucially unstressed front vowels like /i/ – to /ə/ the palatal remains even though schwa would be expected to be preceded by [x]. Ellipsis in the first example at Stage 2 and Stage 3 means that there is a part of the word containing a stressed vowel.

(8)

	Stage 2:				Stage 3:	
/xi…/	/xe/	/xɑ/	>	/çə…/	/xe/	/xɑ/
[çi…]	[çe]	[xɑ]		[çə…]	[çe]	[xɑ]

In this type of example Vowel Reduction counterbleeds velar fronting. From the synchronic perspective speakers at Stage 3 acquire underlying representations like the ones to the right of the wedge. The phonetic palatal [ç] at Stage 3 is clearly an underlying palatal synchronically (/ç/) because its original trigger has been eliminated. That underlying palatal is a quasi-phoneme because [ç] and [x] never contrast in the context before schwa.

(bb): In this type of dialect there is a historical process (Rule Z) which eliminates triggers for velar fronting, but that change does not bleed velar fronting. An example of Rule Z attested in the dialects discussed in Chapter 9 is the replacement of a diphthong ending in a front vowel with a back monophthong (/ɑi/ > /ɑ/).

(9)

	Stage 2:				Stage 3:	
/ɑx/	/ix/	/ɑix/	>	/ɑx/	/ix/	/ɑç/
[ɑx]	[iç]	[ɑiç]		[ɑx]	[iç]	[ɑç]

Synchronically the younger generation of speakers acquires underlying representations like the ones to the right of the wedge. The palatal must be treated as an underlying sound (/ç/) because the earlier trigger is no longer present.

The two overapplication outcomes (ba and bb) do not imply that velar fronting is lost at Stage 3. First, in a dialect in which [x] and [ç] (< [x]) only contrast in the context of one or more back vowel, [ç] can be synchronically derived from /x/ in the context of front vowels. Second, there are still regular morphophonemic alternations triggered by Umlaut represented by StG [bɑx] 'stream' vs. [bɛçə] 'stream-PL'. Even though Umlaut alternations like [ɑ]~[ɛ] are irregular, if a stem

has a front vowel alternant and if that front vowel is followed by a dorsal fricative which is a trigger for velar fronting then the dorsal fricative surfaces as palatal. This generalization is true for all dialects without exception. The transition from Stage 2 to Stage 3 in (9) therefore entails two changes. First, the original palatal allophone for the older generation is now a phonemic palatal for the younger generation. And second, velar fronting undergoes the change from an allophonic process (Stage 2) to a neutralization (Stage 3). Likewise in varieties with the palatal quasi-phoneme /ç/ the change from Stage 2 to Stage 3 involves a reinterpretation of velar fronting from an allophonic rule to a quasi-neutralization.

One of the parameters mentioned earlier (output of velar fronting) is not indicated in Figure 2.2. Recall from Chapter 10 that there are two different outcomes for a /x/ target: nonsibilant palatal [ç] and sibilant alveolopalatal [ɕ]. Alveolopalatalization involves two modifications to the Stage 2 system with the allophones [x] and [ç]. First, [ç] is realized for innovative speakers as the new allophone [ɕ] which is phonetically and phonologically distinct from postalveolar [ʃ] (/ʃ/). Second, [ɕ] and [ʃ] merge for the next generation to [ɕ], which is phonemic (/ɕ/) because it contrasts with [x] (/x/) in the context after a back vowel. That merger does not exhibit opacity because the new phoneme /ɕ/ in the context after a back vowel does not derive historically from a velar (but instead from the coronal [ʃ]). The three stages for alveolopalatalization are depicted in Table 16.6. Stage 2 is the same as Stage A.

Table 16.6: Alveolopalatalization

Stage	Underlying and phonetic representations
2 (=A)	/ix/ [iç], /ɑx/ [ɑx], /iʃ/ [iʃ], /ɑʃ/ [ɑʃ]
B	/ix/ [iɕ], /ɑx/ [ɑx], /iʃ/ [iʃ], /ɑʃ/ [ɑʃ]
C	/ix/ [iɕ], /ɑx/ [ɑx], /iɕ/ [iɕ], /ɑɕ/ [ɑɕ]

It is argued that alveolopalatalization ([ç ʃ] > [ɕ]) is not expressed in terms of phonological rules; hence the realization of /x/ as [ç] at Stage 2/Stage A is captured formally with the same rule of velar fronting as the realization of /x/ as [ɕ] at Stage B. That the output of velar fronting is realized first as a nonsibilant and then only later as a sibilant is expressed not in the phonology, but instead with rules of phonetic implementation.

16.7 Velar fronting and the actuation problem

One question not addressed above is why velar fronting failed to phonologize in other languages/dialects with /x/. Put differently: Why was velar fronting phonologized at one particular time (ca. twelve hundred years ago) and in one particular place (modern-day Germany) but not at another time or in another place? The question posed here is a very general one that not only pertains to velar fronting but to any type of change. Weinreich & Herzog (1968) call it the ACTUATION PROBLEM, which they phrase as follows (p. 102): “What features can account for the actuation of changes? Why do changes in a structural feature take place in a particular language at a particular time, but not in other languages with the same feature, or in the same language at other times?”[11]

Nine years before Weinrich, Labov and Herzog published their article, Lüdtke (1959) pondered the actuation problem with respect to velar fronting. In particular, he made a proposal for why velar fronting was phonologized in Germany and not in the Netherlands: Lüdke observed that German (=LG/CG) has a phonemic lenis /ʝ/, – in present terms, the etymological palatal – which served as a catalyst for the creation of fortis [ç] by velar fronting. The reason the fronting of velars after front vowels was not phonologized in the Netherlands is that Dutch has a palatal glide /j/ (< WGmc $^{+}$/j/), but no /ʝ/. Since there is no palatal fricative phoneme in the Dutch system (Gussenhoven 1992, Booij 1995, Verhoeven 2005) there was no precondition for the phonologization of velar fronting.

Lüdke’s proposal is an attractive one, but it is not consistent with my claim that WGmc $^{+}$/ɣ/ underwent velar fronting to the palatal fricative allophone [ʝ] in word-initial position before Glide Hardening created the phoneme /ʝ/ from WGmc $^{+}$/j/ (§4.2). One might respond that my claim concerning the time frame for Glide Hardening is not correct. This may be the case; however, there is a deeper reason for why it is difficult to successfully account for the geography of velar fronting given the type of approach advocated by Lüdke. In particular, the truly difficult question is why that change failed to phonologize in the H(st)Almc and SBav regions of Switzerland and Austria (Tyrol). Those dialects are similar to Dutch in the sense that they possess the palatal glide /j/ (<WGmc $^{+}$/j/) and not the corresponding fricative. Assuming for the sake of argument that there is an independent reason for why velar fronting failed to phonologize in Switzerland and Austria (Tyrol), there remain two unresolved questions: (a) Why was velar fronting phonologized throughout UG (LAlmc, Swb, EFr, NBa, MBav) in

[11]For recent discussion of the actuation problem the reader is referred to Walkden (2017). See also Janda (2005: 401), who discusses briefly the actuation problem with respect to the fronting of velars before front vowels, i.e. Velar Palatalization as described in Appendix I.

South Germany and Austria?, and (b) why was velar fronting phonologized in a number of places (Chapter 15) independently from one another? The reason why these two questions are difficult to answer is that whatever structural feature one proposes for the non-velar fronting varieties of H(st)Almc and SBav, that same structural feature is most likely present in all of the places in (b) and in many of the places in (a).

17 Velar Fronting in Standard German

> Ihnen beiden verschiedenen Lauten des *ch* … weiss ich keine schicklicheren Namen zu geben, als wenn ich jenen den Achlaut, diesen aber den Ichlaut nenne.[1]
>
> Gottfried August Bürger (1798: 131)

17.1 Introduction

Previous chapters have scrutinized the status of velar fronting in a broad selection of regional varieties of German. The goal of the present chapter is to discuss the patterning of the ich-Laut and the ach-Laut in StG and to demonstrate that the distribution of those sounds reflects patterns encountered in previous chapters. §17.2 presents a representative selection of data and an analysis thereof, and §17.3 concludes by considering three of the research questions from §1.4.4 in light of the treatment of StG. §17.2 also includes a few brief remarks on the distribution of [ç] and [x] in the standard German language of Austria (StAG) and shows how StG differs from StAG.

17.2 Data and analysis

StG (de Boor et al. 1969, Krech 1982, Mangold 2005) has the phonemic front vowels /iː ɪ yː ʏ eː ɛ ɛː øː œ/, the phonemic back vowels /uː ʊ oː ɔ ɑː ɑ ə/, and the three phonemic diphthongs /ɑi ɔy ɑu/. The literature cited in §1.2 has focused almost exclusively on the data described below.

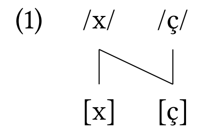
The two dorsal fricatives are [x] and [ç]. Lenis [ɣ] is not a surface sound, although there is a synchronically derived |ɣ| (from /g/), as in LRG (§5.3.1). There is no lenis palatal fricative ([ʝ]).[2]

[1] "I do not know a more fitting name to give the two different sounds of *ch* … than if I call the one the ach-Laut and the other the ich-Laut".

[2] A long-standing debate in the literature is whether or not the initial sound in words like *ja* 'yes' is a fricative ([ʝ]) or a glide ([j]). In contrast to many of the LG and CG varieties discussed in

The patterning of [x] and [ç] is expressed for postsonorant position in (1).[3]

(1)



The patterning of [ç] and [x] can be summarized as follows: (A) [ç] – but not [x] – surfaces after a front vowel but not after a phonemic back vowel, and [x] – but never [ç] – occurs after a phonemic back vowel but not after a front vowel, (B) [ç] surfaces after the two coronal sonorant consonants [n l], but [x] never does, (C) [ç] – but never [x] – occurs after the back vowel [ɐ] or after the dorsal consonant [ʀ], both of which derive from /ʀ/, and (D) [ç] – but never [x] – is the realization of *ch* in the diminutive suffix *-chen* regardless of the nature of the preceding sound. I demonstrate below that [ç] and [x] in (A)-(B) derive from /x/ by velar fronting, while the [ç] in (C)-(D) is an underlying palatal (/ç/). As discussed below, the contexts described in (C) and (D) involve (historical) overapplication opacity because [ç] (from an earlier velar) was historically preceded by a front ([coronal]) sound.

The items listed below exemplify generalization (A): [x] surfaces after phonemic back vowels in (2a and 3a) and [ç] after front vowels in (2b and 3b). The dorsal fricatives in (2) are in coda position, but the same sounds are in intervocalic position in (3). The data in (2) and (3) together therefore show that the syllable cannot be a factor in the distribution of [x] and [ç]. [x ç] in examples like the ones in (2) and (3) are the modern realizations of historical fortis velars (WGmc *[k x]).[4]

the present book, StG does not have alternations between [ɣ] and [ʝ] indicating that the latter sound patterns phonologically like a fricative. I treat the StG sound represented by *j* henceforth as the glide ([j]). See Wiese (1996b) and Hall (2007) for discussion and formal treatments.

[3]Neither of those sounds occur in word-initial position in the native lexicon. The basic generalizations concerning the patterning of word-initial [x] and [ç] in loanwords is unclear and is therefore not discussed in the present chapter. See Appendix G and Robinson (2001) for elaboration.

[4]There are several accidental gaps. For example, no native words are attested in which a dorsal fricative occurs after [eː], although [ç] surfaces after short [e] in the nonnative word *Mechanik* 'mechanics'. After [oː] and before a vowel, [x] is apparently only attested in the toponym *Bochum*. The only word to my knowledge with a dorsal fricative ([ç]) following [øː] is the realization of the morpheme *hoch* 'high' with an umlauted stem vowel (i.e. [høːç-] in [høːçst] 'extreme'). Finally, no dorsal fricatives occur after [ə].

(2) Postvocalic dorsal fricatives (from /x/) in the coda:

a.	[tuːx]	Tuch	‘towel’
	[bʊxt]	Bucht	‘bay’
	[hoːx]	hoch	‘high’
	[kɔx]	Koch	‘cook’
	[nɑːx]	nach	‘after’
	[bɑx]	Bach	‘stream’
	[bɑux]	Bauch	‘stomach’
b.	[ziːç]	siech	‘ailing’
	[lɪçt]	Licht	‘light’
	[gəʀʏçt]	Gerücht	‘rumor’
	[gəʃpʀɛːç]	Gespräch	‘conversation’
	[ʀɛçt]	recht	‘right’
	[høːçst]	höchst	‘extreme’
	[vœç.nə.ʀɪn]	Wöchnerin	‘woman in childbed’
	[ʀɑiç]	Reich	‘empire’
	[ɔyç]	euch	‘you-DAT/ACC.PL’

(3) Postvocalic dorsal fricatives (from /x/) before a vowel:

a.	[kuːxən]	Kuchen	‘cake’
	[bəɑnʃprʊxən]	beanspruchen	‘claim-INF’
	[knɔxən]	Knochen	‘bone’
	[ʃprʀɑːxə]	Sprache	‘language’
	[mɑxən]	machen	‘do-INF’
	[tɑuxən]	tauchen	‘dive-INF’
b.	[ʀiːçən]	riechen	‘smell-INF’
	[møːklɪçə]	mögliche	‘possible-INFL’
	[flyːçə]	Flüche	‘curse-PL’
	[kʏçə]	Küche	‘kitchen’
	[gəmɛːçɐ]	Gemächer	‘chamber-PL’
	[lœçɐ]	Löcher	‘hole-PL’
	[ɑiçə]	Eiche	‘oak tree’
	[kɔyçən]	keuchen	‘gasp-INF’

The distribution of [x] and [ç] as in (2) and (3) is also reflected in many morphophonemic alternations like the one in (4): [x] surfaces after a back vowel in the morphologically underived word (e.g. singular noun) and [ç] after the corresponding front vowel (via Umlaut) in the morphologically derived word (e.g. plural noun). As in (2) and (3), [x ç] in examples like these derived historically from WGmc *[k] or *[x].

(4) [x]~[ç] alternations (from /x/):

a.	[buːx]	Buch	‘book’
	[byːçɐ]	Bücher	‘book-PL’
b.	[lɔx]	Loch	‘hole’
	[lœçɐ]	Löcher	‘hole-PL’
c.	[bɑx]	Bach	‘stream’
	[bɛçə]	Bäche	‘stream-PL’

The data in (2–4) are captured by analyzing the dorsal fricatives as /x/, which surfaces as palatal after a front vowel by Velar Fronting-1:

(5) Velar Fronting-1:

[+SON] [−SON, +CONT]

[CORONAL] [DORSAL]

A second source for the surface (coda) palatal fricative [ç] can be seen in (6a, 6b). These words illustrate an alternation between [g] and [ç] after the vowel [ɪ]: The alternant with [ç] occurs in coda position and the one with [g] before a vowel. The [g]~[k] alternations in (6c) show that coda /g/ – like all other voiced obstruents – undergoes Final Fortition to [k] after any vowel other than [ɪ]. The [g]~[ç] alternations in (6a, 6b) are analyzed in the literature cited earlier with an underlying /g/ that spirantizes to [ɣ] in the coda after the vowel [ɪ] by g-Spirantization-2 in (7); cf. g-Spirantization-1, which applies in the context after all vowels (§4.2). Alternating [g] and [ç] in examples like the ones in (6) derived historically from WGmc *[ɣ].[5]

(6) [g]~[ç] alternations (from /g/):

a.	[køːnɪç]	König	‘king’
	[køːnɪgə]	Könige	‘king-PL’
b.	[leːdɪç]	ledig	‘single’
	[leːdɪgə]	ledige	‘single-INFL’

[5] According to Mangold (2005), the stem-final sound in words like the ones in (6a, 6b) is realized as [k] – and not as the expected [ç] – in the context after [ɪ] and before a morpheme containing [ç], e.g. *königlich* [køːnɪk.lɪç] ‘royal’. I do not discuss this type of example because it is not directly related to the topic of velar fronting.

c. [tɑk] Tag 'day'
[tɑigə] Tage 'day-PL'

(7) g-Spirantization-2:

$$\begin{bmatrix} -\text{SON} \\ -\text{CONT} \\ -\text{FORTIS} \\ \text{DORSAL} \end{bmatrix} \rightarrow [+\text{cont}] \;/\; \text{ɪ} __ \; C_0 \;]_\sigma$$

In examples like *König* and *ledig* in (6a, 6b) g-Spirantization-2 produces a derived coda |ɣ| which shifts to |x| via Final Fortition and then surfaces as [ç] by Velar Fronting-1. Hence, surface [ç] in StG can derive from /x/ in (2)-(4) or from /g/ in (6a, 6b). See Hall (1992: 228), Wiese (1996b: 207; 211–212), Robinson (2001), Ito & Mester (2002), and Glover (2011, 2014) for formal treatments of g-Spirantization-2 in StG.[6]

A potential drawback with g-Spirantization-2 involves [g]~[ç] alternations after the diphthong /ɑi/, e.g. [tɑik] 'dough' vs. [tɑigɪç] 'doughy'. If the second part of /ɑi/ is analyzed as /ɪ/ (e.g. Hall 1992, Wiese 1996b), then the incorrect prediction is made that the /g/ should surface as [ç] in coda position in words like [tɑik] (from /tɑɪg/). I argue that the /ɪ/ which serves as the vocalic trigger for g-Spirantization-2 is phonologically [−tense] because it contrasts with the [+tense] vowel /iː/. The second part of the diphthong /ɑi/ is not marked for tenseness because there is no contrast between a diphthong ending in [i] and one ending in [ɪ]. Given this treatment, the /g/ in a word like /tɑig/ is correctly predicted not to spirantize. The reader is referred to Noelliste (2017), who applies that type of treatment to the diphthongs of Ramsau am Dachstein, and to §13.5.1 for a discussion of the diphthongs in CBav varieties of Lower Bavaria.

The words in (8) exemplify the occurrence of [ç] after the two sonorant coronal consonants [l n]; recall generalization (B). The [ç] in examples like these is the modern realization of a historical fortis velar (WGmc *[k x]).

(8) Postconsonantal dorsal fricatives (from /x/):

a. [mœnç] Mönch 'monk'

b. [ɛlç] Elch 'moose'

Palatal [ç] in items like the ones in (8) is precisely what one would expect given that the set of triggers for Velar Fronting-1 consists of all coronal sonorants and

[6]Final Fortition counterbleeds g-Spirantization-2, otherwise the final segment a word like /køːnɪg/ would shift to |k| and bleed g-Spirantization-2. As in Altengamme (§4.2), the type of counterbleeding relationship between Final Fortition and spirantization described here does not involve opacity.

that /l n/ are both [coronal] and [+sonorant]. Hence, surface [ç] after /l n/ derives from /x/.

Palatal [ç] – but not velar [x] – surfaces after dorsal /ʀ/, which is realized optionally in the phonetic representation the consonant [ʀ] or as the vowel [ɐ]; recall generalization (C). Representative examples are presented in (9a). The same [ʀ]/[ɐ] variants occur after any short vowel and before an optional coda consonant; see (9b). After any long vowel, /ʀ/ surfaces as [ɐ]; see (9c). The literature in which data like these are discussed include Moulton (1962: 36), Hall (1993), Mangold (2005: 54), Wiese (1996b: 253ff.), and Glover (2014). The [ç] in words like the ones in (9a) derived historically from a fortis velar fricative (WGmc *[x] or *[xx]). The significance of the examples in (9a) is that they involve (historical) overapplication opacity because the palatal (from an earlier velar) surfaces after a back sound.

(9) [ʀ] and [ɐ] (from /ʀ/):

a.	[dʊʀç], [dʊɐç]	durch	'through'
	[kɪʀ.çə], [kɪɐ.çə]	Kirche	'church'
b.	[ɪʀt], [ɪɐt]	irrt	'be mistaken-3SG'
	[ɪ.ʀən]	irren	'be mistaken-INF'
c.	[tyːɐ]	Tür	'door'
	[tyː.ʀən]	Türen	'door-PL'

I analyze the sound underlying [ʀ]/[ɐ] in (9) as /ʀ/, which surfaces as [ɐ] by (10). I do not attempt to capture the optionality of that process after short vowels – a condition that accounts for the variant pronunciations in (9a, 9b). The target (/ʀ/) is [+consonantal, +sonorant, −nasal, dorsal], and the output ([ɐ]) is [−consonantal, +sonorant, −nasal, dorsal]; hence, r-Vocalization only changes [±consonantal]; see Hall (1992: 57, 1993), Wiese (1996b: 256), and Glover (2014).

(10) r-Vocalization:

$$\begin{bmatrix} \text{+CONS} \\ \text{+SON} \\ \text{−NASAL} \\ \text{DORSAL} \end{bmatrix} \rightarrow [\text{−cons}] \; / \; __ \; C_0 \;]_{\sigma}$$

Since the trigger Velar Fronting-1 in (5) bears the frontness feature ([coronal]), that process cannot apply after /ʀ/, which is [dorsal]. It is precisely for that reason that I analyze [ç] in the context after a rhotic as an underlying palatal (quasi-phoneme), e.g. /dʊʀç/ and /kɪʀçə/ for (9a). One might attempt to argue that /x/ can

produce [ç] after /ʀ/ if the latter sound is analyzed phonologically as [coronal], but that treatment was considered and rejected for various regional dialects in §7.4.2. For further discussion see §17.3.1.

Recall from Chapter 7 that several varieties of German are attested in which the palatal quasi-phoneme occurs in the context of various back sounds, including the vocalized-r. It was demonstrated in that chapter that there was an earlier historical stage in which dorsal /ʀ/ was coronal (/r/), and that the earlier /r/ triggered the shift from /x/ to [ç] by velar fronting, which at that point was an allophonic rule. All surface palatals at that earlier stage were derived from /x/, but when the old front segment /r/ became back (/ʀ/) by r-Retraction (§3.4), the surface palatal was quasi-phonemicized in that one context. Given that development it is not surprising that StG has [ç] after a back (dorsal) sound because that back sound used to be front.

The StG words with the diminutive suffix *-chen* presented in (11) indicate that that the initial sound in that suffix consistently surfaces as [ç], regardless of whether or not it occurs after a stem ending in a back vowel in (11a), a front vowel in (11b), or a consonant in (11c). The initial fricative in that suffix is a historical velar (WGmc *[x]). The most significant example is the one (11a), since palatal [ç] otherwise never occurs after a front vowel; hence, example (11a) exemplifies (historical) overapplication opacity. The examples in (11) illustrate generalization (D) stated earlier.

(11) StG *-chen* (/-çən/):

a.	[tɑuçən]	Tauchen	‘rope-DIM’ (cf. [tau] Tau ‘rope’)
b.	[ɑiçən]	Eichen	‘egg-DIM’ (cf. [ɑi] Ei ‘egg’)
c.	[hʏntçən]	Hündchen	‘dog-DIM’ (cf. [hʊnt] Hund ‘dog’)

Note that there are examples of minimal pairs, e.g. [tɑuxən] ‘dive-INF’ (from 3b) vs. [tɑuçən] ‘rope-DIM’ (from 11a).

I follow Robinson (2001) in analyzing the initial segment of *-chen* as an underlying palatal (/ç/). Hence, a word like [tɑuçən] ‘rope-DIM’ is underlyingly /tɑu-çən/. The underlying palatal drives support on the basis of the history of the *-chen* suffix, as discussed below in §17.3.2.

The occurrence of [ç] after the vocalized-r in (9) and after back vowels in (11a) points to surface opacity in StG. By contrast, the distribution of [ç] and [x] in StAG is transparent (Hildenbrandt 2013, Moosmüller et al. 2015). In StAG [ç] surfaces after a front vowel and [x] after a back vowel, including the vocalized-r, e.g. [kiɐxɛ] ‘church’. Since *-chen* does not occur in StAG, there are no words where [ç] surfaces after a back vowel. (I mention two additional differences between

StG and StAG here: First, in StAG there are no alternations between [g] and [ç], as in (6); cf. StAG [kø:nɪk] 'king', [kø:nɪgə] 'king-PL'. Second, [ç] is realized as [k] in StAG in word-initial position in loanwords, e.g. StAG [kemi:] 'chemistry'. See Appendix G for discussion).

17.3 Discussion

I consider three of the research questions posed earlier (§1.4.4) that have been discussed intensively in the literature on the synchronic phonology of German. The literature referred to here concerns itself primarily with StG, although the same questions are also relevant for many of the dialects investigated in preceding chapters. In §17.3.1, I consider and reject the proposal that the rhotic ([ʁ]/[ɐ]) is an articulation conducive to velar fronting. In §17.3.2 I defend the treatment proposed above with an underlying palatal in *-chen*. Finally, in §17.3.3 I discuss the question of whether or not the rule relating [ç] and [x] derives the palatal from the velar or the velar from the palatal and argue in favor of the former treatment.

17.3.1 /ʁ/ is not a phonetically natural environment for [ç]

In his discussion of the distribution of German [x] and [ç], Robinson (1992: 78–81) cites some of the phonetics literature – in particular Ulbrich (1972) – suggesting that surface vocalized-r ([ɐ]) is phonetically a front vowel. According to the material collected by Ulbrich, the [ɐ] in the context after a short vowel and before a palatal fricative (e.g. in a word like [dʊɐç] 'through' from 9a) is further forward than the [ɐ] in other contexts. Robinson's conclusion is that [ɐ] is a "phonetically natural environment for [ç]".

Since his (pan-dialectal) equivalent of Velar Fronting-1 spreads [coronal] from a sonorant sound to a following /x/, Robinson concludes that [ɐ] should therefore be analyzed phonologically as [coronal].[7] Robinson emphasizes that the occurrence of a palatal after [ɐ] is the expected realization of /x/. One could rephrase Robinson's position in the present framework by asserting that the occurrence of [ç] after [ɐ] is transparent, although Robinson eschews the latter term. In any case I reject his interpretation and argue instead that palatal [ç] after [ɐ] exemplifies opacity and not transparency. I therefore analyze the palatal in words like

[7]In fact, it is not entirely clear from the passage in Ulbrich that [ɐ] can be considered a front vowel from the point of view of phonetics. Robinson's translation of the passage in question is '[ɐ] tends...a great deal toward [ə] or [ɪ]', but [ə] is central and not front.

[dʊɐç] 'through' as an underlying palatal (quasi-phoneme) and not as a palatal derived from /x/. Two arguments can be levelled against Robinson's treatment, which I consider in turn.

First, there are German dialects with some version of velar fronting after front vowels, but /x/ surfaces in those dialects without change as [x] after [ɐ]. Data from two of those dialects (from §3.5 and §4.3 respectively) are repeated in (12). As discussed earlier, the realization of /x/ as [x] in examples like these is the expected (i.e. transparent) realization because the sound preceding /x/ is [dorsal] and not [coronal]. Recall from §2 that [x] surfaces after the vocalized-r in StAG as well.

(12) Velar [x] (from /x/) after [ɐ] (from /ʀ/) in Soest (a) and Ramsau am Dachstein (b):

a.	[bɛːɐx]	Berg	'mountain'
	[tvɛːɐx]	Zwerg	'dwarf'
b.	[ʃtɔɐx]	Storch	'stork'
	[kiɐxŋ]	Kirche	'church'

Robinson does not discuss dialects like the ones in (12). If [ɐ] were a front (i.e. [coronal]) vowel in StG (as per Robinson), then it is not clear how he would analyze the dialects in (12). One could speculate that the [ɐ] in that type of dialect is phonetically further back than the [ɐ] in StG (and perhaps phonologically [dorsal] as well), but this strategy stands in clear contrast to the implicit claim in Robinson (2001) that his treatment holds for all German dialects. In any case, I hold that the burden of proof lies on the shoulders of linguists who claim that there are dialects with a coronal [ɐ] and those with a dorsal [ɐ].

Second, and most important, it is not clear how Robinson's treatment actually works. According to his analysis, the [coronal] sound [ɐ] derives from /ʀ/, which is he analyzes as a singleton [dorsal]; see Robinson (2001: 113). His equivalent of Velar Fronting-1 spreads [coronal] from a sonorant to a following dorsal fricative, although he sees the target segment as [+high] and not [dorsal]. In any case, underlying /x/ correctly surfaces as the corono-dorsal fricative [ç] after a front vowel, as in my own treatment. However, Robinson never says how /ʀ/ changes from [dorsal] to [coronal] in words like [dʊɐç] 'through' and [kɪɐçə] 'church'. Since Robinson sees every instance of [ɐ] is [coronal] and not simply the [ɐ] before [ç], the change from [dorsal] to [coronal] needs to occur in a context-free fashion. One can speculate that the featural change described here is a part of r-Vocalization (which Robinson never formalizes), but if so, we have no explanation for why the vocalization of a consonant should also entail the change in place.

None of these problems hold for the present analysis. As noted above, Velar Fronting-1 correctly fails to affect the /x/ in examples like the ones in (12) and therefore surfaces without change as [x]. The dorsal fricative in StG examples like [dʊɐç] 'through' and [kɪɐçə] 'church' cannot be /x/, otherwise [x] would be the expected surface realization. The surface palatal fricative in examples like those is therefore an underlying palatal (quasi-phoneme). If it is true that [ɐ] is further forward before [ç] than in other contexts, then this is due to phonetic implementation and is not an articulation that a phonological analysis can or should account for. Put differently, the fronted [ɐ] in words like [dʊɐç] 'through' is a consequence of [ç] and not the other way around.

17.3.2 Status of *-chen*

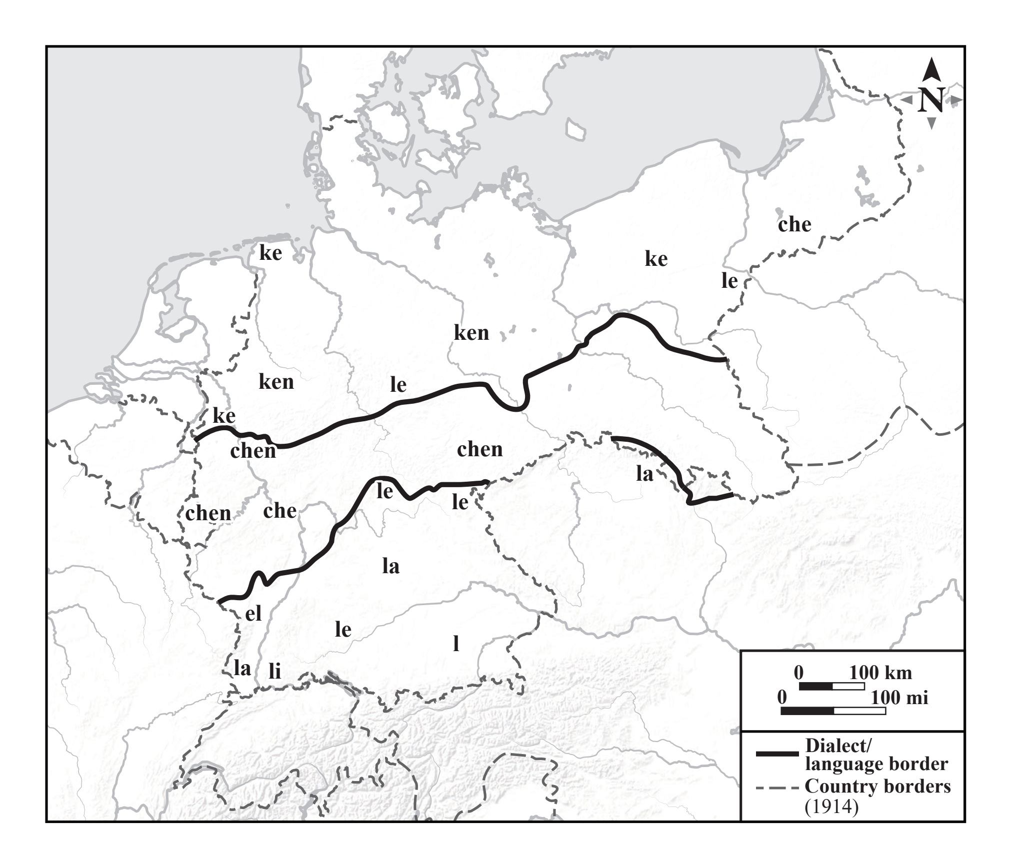
It was noted in chapter 1 that the analysis of [-çən] in words like [tauçən] 'rope-DIM' in (11a) is moot for most of the dialects discussed in the present book because those dialects do not have [-çən] or any variant of that suffix with [ç]. See also Robinson (2001: 64–70), who bases his remarks on the maps in Tiefenbach (1987). See Map 17.1.

For example, LG dialects have a [k]-initial diminutive that is some variant of [-kən], while UG varieties have an [l]-initial variant of [-lɑin], the latter of which also occurs in StG, e.g. *Kindlein* 'child-DIM'; cf. *Kind* 'child'. Not surprisingly, those patterns are reflected in the original sources cited earlier. For example, in the HstAlmc dialect of Visperterminen (§6.2), Wipf (1910: 168–172) discusses at length the following realizations of the diminutive in her dialect: [-i], [-li], [ji], [-tsi], [-tʃi] and [-ki], but no mention is made of a variant with [ç]. The same point holds for the Wph dialect of Soest (§4.3), where the diminutive appears to be consistently realized as [kn̩]; see Holthausen (1886).

These points aside, it is undeniably the case that [-çən] – or a similar variant with [ç] – occurs in many of the other dialects investigated in the preceding chapters, in particular CG dialects, on which StG is based. Some of the CG sources cited earlier list examples with *-chen*, while others do not. In (13) I give examples from three of the former dialects. In each item, *-chen* surfaces with [ç] even after stems ending in non-front segments:

(13) [-çən] after nonfront sounds in CG dialects:

a.	kœpçən	[kœpçən]	Tasse	'cup-DIM'	Hasenclever (1905: 86)
b.	kibχən	[kibçən]	Kuh, dim	'cow-DIM'	Hofmann (1926: 151)
c.	begχən	[begçən]	Bock, dim	'buck-DIM'	Schirmer (1932: 21)



Map 17.1: Diminutive suffixes in High and Low German. Adapted from Tiefenbach (1987).

The problem that has been discussed at length in the theoretical literature cited in §1.2 is how to account for the opaque palatal in -*chen* after a stem ending in a back vowel in StG (as in 11a), although the same issue holds for the realization of that suffix after nonfront segments in other varieties of German, as in (13).

As stated above, I hold that the initial segment in the diminutive suffix [-çən] in StG is an underlying palatal (/ç/). The same analysis can be applied to dialect data like the ones in (13). Since the target segment for velar fronting is by definition a velar that process cannot affect the /ç/ in /-çən/, which therefore surfaces as [çən] even after nonfront sounds. An analysis of the initial segment in [-çən] as an underlying velar /x/ with a separate rule applying only at the left edge of a morpheme is hardly credible for the simple reason that the rule required would only apply in a single morpheme.

The underlying palatal /ç/ in [-çən] is a direct consequence of the history of that suffix. The MHG reflex of [-çən] was -*ichen* (Seebold 2011: 171). The reader is also referred to the extensive discussion of the German diminutive suffixes in Schirmunski (1962: 475–488). Since the dorsal fricative represented by *ch* followed the front vowel *i*, it was realized as the palatal fricative [ç] at the point where velar fronting became phonologized (=Stage 2 in the historical model described in §2.5). When the initial vowel [i] in -*ichen* was elided, [ç] came to stand after any stem, even if that stem ended in a back vowel. At that point, the original allophone [ç] changed into /ç/, as indicated in (14). I give the underlying and phonetic representations for both historical stages. I include only the relevant features for /i/ and /x/, namely [coronal] and [dorsal]:

(14)

/i	x	ə	n/	>	/ç	ə	n/
[i	ç	ə	n]	>	[ç	ə	n]
[CORONAL]	[DORSAL]				[CORONAL]	[DORSAL]	

To the left of the wedge the dorsal fricative is underlyingly /x/, which surfaces as [ç] by some version of velar fronting. The result of that spreading operation is the creation of a synchronically derived complex segment which is [coronal] and [dorsal]. When the initial /i/ was elided the feature [coronal] was retained on the newly-created underlying segment /ç/.

17.3.3 Velar to palatal or palatal to velar?

An issue dealt with at length in the literature on StG phonology is whether or not the rule relating [ç] and [x] derives the former from the latter or the latter from the former (§1.2, §7.4.3). The same question can be posed with respect to the velars and palatals in the velar fronting dialects discussed in the present book. The two options referred to here are stated in (15), where (15a, 15b) apply in the post-sonorant context and (15c, 15d) word-initially. In (15), [x] and [ç] are understood to be representative for any type of velar and palatal respectively.[8]

(15) a. /ç/ → [x] / ...
b. /x/ → [ç] / ...
c. /ç/ → [x] / $_{\mathrm{Wd}}$[...
d. /x/ → [ç] / $_{\mathrm{Wd}}$[...

[8]From the historical perspective, (15b, 15d) are uncontroversially correct, but the debate described below holds for the synchronic phonology. If (15a) and/or (15c) can be shown to be correct synchronically, then rule inversion must have taken place; recall Neuendorf (§8.5).

Compare, for example, the treatment proposed for StG above, which adopts (15b), with the one in (16) and (17), which presupposes (15a). Variants of (15a) for StG have been proposed in a number of the works cited earlier (e.g. Wurzel 1980, Meinhold & Stock 1982, Hall 1989).

(16) Underlying /ç/ in StG (rejected):

a.	/tuːç/	⟶	[tuːx]	‘scarf’
b.	/lɪçt/	⟶	[lɪçt]	‘light’
c.	/dʊʀç/	⟶	[dʊʀç], [dʊɐç]	‘through’

(17) Hypothetical alternative to velar fronting (rejected):
/ç/ → [x] / {back vowels}__

The consequence of the treatment in (16) and (17) is that it must require a special provision for the occurrence of [ç] in the diminutive suffix [çən] after a back vowel; recall [tɑuçən] ‘rope-DIM’ from (11a).

The “velar to palatal” approach in (15b, 15d) was uncritically adopted for StG as well as the German dialects discussed in Chapters 3–15, but it is important to consider what the proposed treatment for those varieties might look like if velars were being derived from palatals, as in (15a, 15c). Although one variety was discussed earlier in which the “palatal to velar” change in word-initial position (=15c) is the only possible one (Neuendorf in §8.5), it is demonstrated below that in the overwhelming number of dialects – including StG – the “velar to palatal” analysis is correct.

There are three reasons why a rule changing a palatal to a velar either leads to treatments that are far less explanatory than ones with a velar changing to a palatal or does not even work on technical grounds. (The unique case of Neuendorf is discussed at the end of this section). For convenience, I refer henceforth to the “palatal to velar” treatment in (15a, 15c) as the Pa⟶Ve Analysis.

The first argument against the Pa⟶Ve Analysis pertains to the dialects discussed in Chapters 8–10 and many of the varieties in Chapter 11. Those dialects have in common that velars (e.g. [x], [ɣ]) and palatals (e.g. [ç], [ʝ]) contrast in the context of the same back sounds. As demonstrated in those chapters, velar fronting is still active synchronically as a rule neutralizing the palatal vs. velar contrast to palatal in the context of front segments. That type of dialect is important because the Pa⟶Ve Analysis does not even work technically. As a representative example, consider Schlebusch (§10.3.1): [x] occurs only after a back vowel, but [ç] surfaces after a front vowel, coronal sonorant consonant, or back vowel. On the basis of these generalizations it was demonstrated that velar fronting applies to /x/ in the context after a coronal sonorant. For example, /x/ surfaces as

[ɕ] in [løːɕə] 'hole-PL' (from /løːx-ə/), but /x/ is realized without change as [x] in [lɔx] 'hole' (from /lɔx/). It was noted in §10.3.1 that one does not even have the option of analyzing such data with an underlying /ɕ/ which surfaces as [x] after a back vowel, as in (15a). The reason is that there are many morphemes with nonalternating [ɕ] after a back vowel which would incorrectly undergo the rule, e.g. [vrɔɕ] 'frog (from /vrɔɕ/)' (cf. [vrøɕ] 'frog-PL' from /vrøɕ/).

In Table 17.1 I provide a list of dialects investigated in Chapters 8–11 in which the Pa⟶Ve Analysis does not work (as in Schlebusch) because velars and the corresponding palatals contrast in the neighborhood of the same back vowel. The examples in the final three rows refer to word-initial position, while the remaining ones refer to postsonorant position. The velars and palatals in question are listed in the final column. I do not attempt to list all of the dialects investigated in Chapters 8–11 involving word-initial [ʝ] and [ɣ]/[g] because that is an extremely common pattern.

Recall from Table 10.1 that there are many CG varieties like Schlebusch, Luxembourgish, Leipzig, Cologne, Frankfurt am Main/Montabaur that could be added to the Table 17.1.

The second reason for calling the Pa⟶Ve Analysis into question is that the alternative rules involved often require disjunctions in which one of the contexts is clearly ad hoc. As a representative example consider the distribution of word-initial [x] and [ç] in Soest (§4.3): Recall that [x] surfaces in that variety before back vowels or sonorant consonants and [ç] before front vowels. The correct rule therefore converts /x/ to palatal in word-initially before a front vowel. If /ç/ were taken as basic then the rule would create [x] in word-initial position before (a) back vowels or (b) sonorant consonants (/l n ʀ/). The problem is that context (b) is an arbitrary list of sounds that fails to express the assimilatory nature of the rule. In Table 17.2 I list some of the dialects investigated in Chapters 3–11 which, like Soest, require an awkward disjunction given the Pa⟶Ve Analysis. In the final column I list the arbitrary contexts that would be required if the velar is derived from the palatal.

A deeper generalization is expressed in Table 17.3, which lists four of the Trigger Types discussed in Chapter 12 and shows the connection between those Trigger Types and the kind of ad hoc contexts required. For example, the Pa⟶Ve Analysis for any dialect with Trigger Type A requires palatals to be realized as velar in the context of nonhigh front vowels or coronal sonorant consonants. The additional problematic Trigger Types and the corresponding disjunctions are listed in Table 17.3 as well.

The reader may recall that disjunctions were posited in several varieties discussed in the previous chapters; however, in contrast to the problematic ones in

Table 17.1: Pa⟶Ve Analysis not possible after a sonorant or word-initially

Place/Region	Section	Sounds
Wissenbach	§9.2	[ç] and [x]
Langenselbold	§9.2	
Weidenhausen	§9.2	
Ebsdorf	§9.2	
Atzenhain/Grünberg	§9.2	
Zell im Mümlingtal	§9.3	
Heppenhaim	§9.3	
Schlebusch	§10.3	[ɕ] and [x]
Luxembourgish	§10.3	
Leipzig	§10.3	
Cologne	§10.4	
Frankfurt am Main/Montabaur	§10.4	
Kreis Bütow	§11.5	[ɲ] and [ŋ]
Lauenburg	§11.5	[c] and [k]
Kreis Konitz	§11.5	[ç ɲ] and [k ŋ]
Reimerswalde	§11.7	[c ɟ] and [k g]
Many dialects	§8, §10, §11	[ʝ] and [ɣ]/[g]
Kreis Konitz	§11.5	[ç] and [k]
Reimerswalde	§11.7	[c ɟ] and [k g]

Tables 17.2 and 17.3, the disjunctions in the present analysis all involve assimilations. Consider as a representative example, the distribution of velars ([x] and [kx]) and palatals ([ç] and [kç] in Rheintal §3.4). In that section it was shown that the velars surface in the context of (a) nonlow front vowels, or (b) coronal sonorant consonants, captured formally with two versions of velar fronting (both assimilatory). By contrast, an alternative given the P⟶V Analysis requires the two contexts: (a) back vowels, or (b) nonlow front vowels, but the (b) context is ad hoc.

The third reason for rejecting the P⟶V Analysis is that in a number of dialects there is a [dorsal] segment serving as a target for velar fronting that is derived synchronically from a [dorsal] nontarget segment. The derived sound in question (|x|) can have more than one synchronic source, namely: (a) /ɣ/ (by Final

Table 17.2: Disjunctions with an ad hoc context assuming the Pa→Ve Analysis

Place/Region	Section	Ad hoc context
Rheintal Rhoden Kamnitz	§3.4 §5.2 §11.5	/ç/→[x] in context of low front vowels
Soest Dorste	§4.3 §4.4	/ç/→[x] word-initially before a sonorant consonant
Obersaxen	§6.3	/ç kç/→[x kk] in context of low front vowels and /ʏu/
Visperterminen	§6.2	/ç kç/→[x kk] in context of nonlow front vowels and neutral vowels
Kreis Rummelsburg	§11.5	/ç ʝ/→[x ɣ] after front lax vowels
Rauchenberg Rhöntal	§7.2	/ç/→[x] after any back vowel other than /ɑː/

Table 17.3: Connection between Trigger Type and ad hoc contexts necessary given the Pa→Ve Analysis

Trigger Type	Ad hoc disjunction
A	Nonhigh front vowel or coronal sonorant consonant
B	Nonlow front vowel or coronal sonorant consonant
C/AA	Nonlow front vowel
D/BB	Coronal sonorant consonant

Fortition), (b) /g/ (by some version of g-Spirantization and Final Fortition), or (c) /ʀ/ (by Laryngeal Assimilation-2 or Final Fortition). The problem for the Pa⟶Ve Analysis is that the type of dialect referred to here requires a rule fronting the derived velar |x| which would be required alongside the rule creating [x] from an underlying palatal; see Glover (2014), who makes the same point for StG. Consider Soest as a representative example. Alternations from that dialect between [ɣ] and [ç] in words like [stui.ɣə] 'climb-INF' vs. [stɪçst] 'climb-2SG' require an underlying velar /ɣ/ which surfaces as [ɣ] after a vowel in a word-internal onset (in [stui.ɣə] from /stuiɣ-ə/). That velar undergoes Final Fortition to |x| in coda position and then velar fronting to [ç] after a front vowel (in [stɪçst] from /stɪɣ-st/). If the Pa⟶Ve Analysis is adopted to capture the complementary distribution of [x] and [ç] not deriving from /ɣ/, e.g. [nɪçtə] 'niece' /nɪçtə/ and [lʊxt] 'air' /lʊçt/, then the rule backing /ç/ to [x] would be unable to front the derived |x| to [ç]. In Table 17.4 I list in the third column the three types of derived velars referred to above and a selection of some of the corresponding dialects from Chapters 3–5 in the first column. Note that Soest has Target Type L discussed in Chapter 12; hence, that one dialect is simply one representative example of a significantly larger set of dialects. Impressionistically many CG varieties not discussed in the present book have some version of g-spirantization; hence, the two examples Altengamme and LRG are simply two representative instances of a much larger sample of German dialects.

Table 17.4: Dialects with a derived velar (|x|) which undergoes fronting

Place/Region	Section	Source for derived velar
Soest	§4.3	|x| from /ɣ/
Altengamme	§4.2	|x| from /g/
LRG	§5.3	
Upper Austria	§3.6	
Erdmannsdorf	§5.3	|x| from /ʀ/
LRG	§5.3	

StG can be included in the list of dialects with |x| derived from /g/. Recall from (9) that there are examples involving [g]~[ç] alternations like [køːnɪç] 'king' vs. [køːnɪgə] 'king-PL'. That type of word requires that /g/ shift to the corresponding fricative (i.e. |ɣ| by g-Spirantization-2 and to |x| by Final Fortition), which then surfaces as [ç] by velar fronting.

There is a small set of dialects discussed earlier in which the relationship between velars ([x]) and palatals ([ç]) is potentially free from the three problems discussed above. In that type of system, velars and palatals fulfill the following three conditions: (a) they are in complementary distribution, (b) the palatals occur in the context of all front vowels (and not a subset thereof), and (c) there are no derived velars that undergo fronting to palatal. Potential examples are listed in Table 17.5. The dialects listed from Chapter 3 are Almc or CBav varieties attested in South Germany, Switzerland, and Austria and ones from Chapter 7 are Eph-speaking areas once spoken in North Germany. Consider Erdmannsweiler as a representative example. In that dialect [ç] surfaces after a front vowel or coronal sonorant consonant and [x] after a back vowel. The velar fronting treatment proposed in §3.2 could be replaced with a Pa⟶Ve Analysis given in the final column of Table 17.5. Note that this is only a potential example of a dialect in which a P⟶V Analysis works technically because the dialect does not possess low front vowels like [æ]. Since that vowel is not present in Erdmannsweiler one cannot know for sure if [ç] or [x] surfaces after that sound. If [ç] surfaced after [æ] then Erdmannsweiler would be a true example of a dialect in which the Pa⟶Ve Analysis works technically, but if [x] surfaced after [æ] then the Pa⟶Ve Analysis would require an ad hoc disjunction ("palatal shifts to velar after a low front vowel"). The same indeterminacy holds for Maienfeld, Ramsau am Dachstein, Reinhausen, and Schieder-Schwalenberg. By contrast, Elspe possesses [æ], before which [ç] occurs; hence, the facts from word-initial position in Elspe represent the only clear-cut case in which the Pa⟶Ve Analysis works technically. Additional examples of dialects like Elspe are ones in which (a–c) are fulfilled which (like Elspe) represent Trigger Type E.

The only example of a German dialect uncovered in the present book in which the relationship between velars and palatals actually requires a rule converting an underlying palatal to velar (as in 15a, 15c) is Neuendorf (§8.5). The correct rule for that dialect (Wd-Initial Palatal Retraction) is stated in prose form in the final column of Table 17.5. Recall from §8.5 that Wd-Initial Palatal Retraction in Neuendorf had a peculiar history: In particular, it was the product of rule inversion from a pre-Neuendorf system with velar fronting. That earlier fronting operation reverted to Wd-Initial Palatal Retraction by the elimination of one of the [coronal] triggers (r-Deletion). It was also mentioned in passing in that earlier chapter (§8.6) that it is notoriously difficult to find unambiguous examples of "palatal to velar" assimilations in any natural language. (In fact, I have found none). That kind of cross-linguistic evidence suggests that it would be misguided to propose a reanalysis of the velar fronting operations for the dialects in Table 17.4 as in the final column.

Table 17.5: Dialects in which the Pa⟶Ve Analysis is technically possible or required

Place/Region	Section	Alternative rule
Erdmannsweiler Maienfeld Ramsau am Dachstein	§3.2 §3.3 §3.5	/ç/⟶[x] after a back vowel
Elspe Reinhausen	§7.2	/ç/⟶[x] word-initially before a [dorsal] vowel
Schieder-Schwalenberg	§7.2	/ç/⟶[x] word-initially before a [dorsal] sonorant
Neuendorf	§8.5	/ç/⟶[x] word-initially before a [dorsal] vowel

In sum, the relationship between velars and palatals in the overwhelming number of German dialects investigated in this book require a rule fronting the velar to the palatal (and not the reverse). That generalization also holds for StG, which has a derived velar (|x|) like the dialects listed in Table 17.4. The only case in which a dialect actually requires a rule backing a palatal to a velar, that type of system emerged via rule inversion.

18 Summary and conclusion

I recapitulate here the status of velar fronting as a synchronic rule (§18.1, §18.2), provide a brief synopsis of that process from the historical perspective (§18.3), and then discuss the significance of my findings (§18.4). The chapter concludes with a series of questions I leave open for further research (§18.5).

18.1 Velar fronting viewed synchronically

Velar fronting differs structurally from dialect to dialect along three parameters: (a) segments undergoing the change (targets), (b) segments inducing the change (triggers), and (c) the nature of the fronted sound created (outputs). Targets consist of one or more velar sound ([k g kx x ɣ ŋ]) and triggers of some combination of coronal sonorants, i.e. front vowels or coronal sonorant consonants ([r l n]). Velar fronting can apply either in a word-initial onset or in postsonorant position.

The relationship between velars (e.g. [x]) and palatals (e.g. [ç]) is expressed with a rule converting the former into the latter (velar fronting) and not the reverse. Both contexts for that rule (word-initial and postsonorant) have a number of different versions depending on the nature of triggers and targets. All versions of velar fronting are regular in the sense that there are no lexical exceptions.

In the overwhelming number of dialects investigated, the front vowel triggers for velar fronting exhibit variation along the height dimension: In some varieties, the segments inducing fronting subsume only high front vowels, in others high and mid front vowels but not the low front vowels, and in yet others all front vowels, regardless of height. The fronting of velars can also be induced by a coronal sonorant consonant ([r l n]). In the most common velar fronting system – the default pattern – the triggers consist of all front vowels and all coronal sonorant consonants. In many areas, historical velars succumbed to velar fronting regardless of the nature of the adjacent sound; thus, velars surfaced as palatal even in the context of back vowels. It is probably not the case that nonassimilatory velar fronting remains active synchronically.

In many varieties, the set of target sounds for velar fronting subsumes all and only velar fricatives ([x] and [ɣ]), but in other systems the target consists solely

of [x] but not [ɣ]. In yet another set of dialects, velar fronting affects not only [x] and [ɣ], but also velar stops and the velar nasal (velar noncontinuants). In dialects with the velar affricate [kx], that sound can also undergo fronting.

In the typical velar fronting system the target segments are realized as the corresponding palatals; hence, only place changes, while manner does not, i.e. [k g kx x ɣ ŋ] surface as [c ɟ kç ç ʝ ɲ] respectively. In the type of dialect referred to here, velar fronting alters a place feature only; in the formal model adopted that feature is [coronal], which spreads from a front ([coronal]) trigger to a velar ([dorsal]) target, thereby creating a complex corono-dorsal (palatal) segment. A common pattern for many varieties of CG is that the fortis fricative /x/ is realized in the front vowel context as the (sibilant) alveolopalatal fricative [ɕ]. Velar fronting in such alveolopalatalizing dialects only alters a place feature; hence, [coronal] spreads to a [dorsal] target, and sibilancy is assigned to that complex segment by rules of phonetic implementation.

An important theme discussed at length in the preceding chapters is the ways in which velar fronting interacts with synchronic and diachronic changes creating or eliminating structures which can potentially undergo or trigger it. In many dialects the relationship between velars (e.g. [x]) and the corresponding palatals (e.g. [ç]) is transparent because velars only occur in the back vowel context and palatals only when adjacent to front sounds. In that type of system, independent processes can either feed or bleed velar fronting. When velars and palatals have a transparent relationship they stand in complementary distribution and are classified as allophones.

A transparent relationship between velars and palatals does not obtain in other dialects. For example, in many varieties, both dorsal articulations occur in the context of front segments. Hence, in addition to expected sequences (e.g. [iç]), there are also unexpected ones (e.g. [ix]). In other systems velars and palatals both occur in the context of back segments; hence, expected sequences (e.g. [ɑx]) occur alongside unexpected ones (e.g. [ɑç]). Both types of system exemplify opacity: A sequence like [ix] in the first system and [ɑç] in the second one illustrate the underapplication and overapplication of velar fronting respectively.

Two types of underapplication have been identified: In one system velar fronting actively creates palatals (e.g. [ç]) from velars (e.g. /x/), and the opaque velar in the front vowel context (e.g. [x] in [ix]) is derived from an independent segment (/A/). In that dialect a sequence like [ɪx] (from /iA/) illustrates the underapplication because the rule creating [x] from /A/ counterfeeds velar fronting. In another type of system, velar fronting is active synchronically (e.g. /ix/ is realized as [iç] and /ɑx/ as [ɑx]), but [x] surfaces unexpectedly in the context of neutral

vowels, i.e. front vowels that are phonetically front but which behave phonologically as nonfront (e.g. /øix/ is realized as [øix]). An important generalization is that such neutral vowels were historically back (e.g. [øi] < [ou]). Since [øi] is synchronically /øi/ and not /ou/, systems with neutral vowels do not involve a synchronic counterfeeding relationship between velar fronting and Vowel Fronting ([øi] /øi/ < [ou] /ou/). However, Vowel Fronting does exemplify the historical underapplication of velar fronting.

Two types of overapplication can be distinguished: In one, palatals (e.g. [ç]) occur in the context of front vowels and certain nonfront sounds ([Bk]) and velars (e.g. [x]) only in the context of nonfront sounds with the exception of [Bk]. Observe that palatals ([ç]) and velars ([x]) stand in complementary distribution. All instances of palatals ([ç]) in the context of front vowels derive from the corresponding velars, but opaque palatals ([ç]) in the context of [Bk] are underlying (/ç/) and not derived from velars. Underlying (opaque) palatals in like those are referred to in the present book as palatal quasi-phonemes. In another type of system, velars and palatals both contrast in the neighborhood of the same back sounds. In that type of dialect velars and palatals are both underlying sounds in the context of the same back vowels (e.g. /x/ and /ç/). Underlying palatals in that type of example are referred to throughout this book as phonemic palatals. In dialects where palatals and velars are both phonemic, velar fronting is still active synchronically in order to capture regular alternations between velars and palatals because palatals but never velars surface in the front vowel context.

18.2 Additional properties of velar fronting

Velar fronting is categorical and not gradient because it relates only two articulations – velar (back dorsal) and palatal (front dorsal) – and not multiple articulations, i.e. the fine-grained back dorsals and/or front dorsals observable in the phonetics. This interpretation of velar fronting accounts for the fact that the back dorsal fricative (e.g. [x]) and the front dorsal fricative (e.g. [ç]) can be perceived by native speakers and that there are established colloquial terms for those two categories (ach-Laut and ich-Laut). By contrast, the distinction between various articulations within the back dorsal or front dorsal category lie below the threshold of consciousness of the linguistically naïve speaker and hence no colloquial terms exist to characterize them. This assessment of velar fronting is true for StG, but it also derives support from most of the descriptive studies on German dialects cited above, whose authors decided to describe the distribution of two categories (velar and palatal) and ignore finer-grained distinctions.

In those dialects where data are available, velar fronting fails to apply in connected speech as a phrasal (postlexical) rule. The trigger and target for velar fronting (in both the word-internal and postsonorant context) therefore belong to the same word. It can also be said that the trigger and target belong to the same morpheme, although the formal rules of velar fronting posited above do not need to encode that fact into their structural description because there are no words where a target (e.g. /x/) and trigger are separated by a morpheme boundary.

In the vast majority of dialects under investigation the trigger and target for velar fronting are adjacent. In some dialects the trigger and target can be separated by an intermediate sound (Q). If Q is schwa (/ə/) then the velar after Q surfaces as palatal if the sound preceding Q is a front trigger (e.g. /iəx/→[iə̧ç] vs. /uəx/→[uəx]). It was shown that velar fronting is such cases is fed by a process creating a fronted ([coronal]) schwa ([ə̧]). In dialects where Q is a liquid (e.g. /ilx/→[ilç] vs. /ɑlx/→[ɑlx]) it was argued that velar fronting is fed by a process merging the frontness feature of the vowel with the frontness feature of the liquid.

One way in which rules of assimilation can vary cross-linguistically is in terms of direction: If the trigger is to the right of the target then spreading is right-to-left (regressive), but if the trigger is to the left of the target then spreading is left-to-right (progressive). If a velar target is situated between two sonorants (e.g. vowels) then spreading is always progressive. That generalization is true without exception; it holds for the native words which have been the object of investigation of the present book as well as nonnative words (Appendix G). Significantly, this is one way velar fronting in German dialects differs from Velar Palatalization because typological work has demonstrated that there are languages in which the latter process can be regressive and others in which it can be progressive.

18.3 Velar fronting viewed diachronically

At an early point in the history of Gmc – namely WGmc – velar fronting was absent (Stage 1). It is hypothesized that velars ([x]) at Stage 1 were subject to some coarticulatory (phonetic) fronting in the context of front vowels, especially high front vowels like [i]. Phonologization (Stage 2) occurred when the difference between velar [x] and the slightly fronted variant (prevelar) was exaggerated to the point where the latter was realized as palatal ([ç]), while the latter remained velar ([x]). At that point velar fronting became active as a synchronic process relating the two dorsal sounds. The target segment for velar fronting at that early stage was the fortis fricative [x] and the triggers were high front vowels like [i].

The newly phonologized rule of velar fronting diffused in terms of time and place to include a greater set of targets (Stage 2a > Stage 2n) and/or triggers (Stage 2aa > Stage 2n). Targets could expand to include not only fortis [x] but also lenis [ɣ], and then noncontinuants ([k g ŋ]). The set of triggers likewise increased to include high and mid front vowels, then all front vowels, and finally all coronal sonorants. In some regions velar fronting went one step further in applying as a nonassimilatory change in the context of front and back segments alike. Those historical stages are all preserved in dialects described in the modern era (late nineteenth century to the present). Of particular significance is Lower Bavaria, where over two hundred villages and towns represent three distinct historical stages.

A small number of dialects display a unique behavior suggesting that the historical paths described in the preceding paragraph need not be slavishly adhered to without exception. In particular, there are cases where velar fronting triggers are sensitive to tenseness (Kreis Rummelsburg), roundedness (Plettenberg, South Mecklenburg, Mitterdorf), and stress (Sörth). Although those places suggest idiosyncratic developments, it is significant that the peculiar sets of triggers comprise natural classes of sounds (e.g. front unrounded vowels, nonlow front tense vowels, high front unstressed vowels) and not arbitrary lists of segments.

The Stage 2 allophonic rule relating [x] and [ç] has undergone a change in many CG varieties whereby the palatal allophone [ç] developed into [ɕ]. Such alveolopalatalizing dialects were shown to require more than one stage. Evidence for those stages comes from modern CG dialects.

Variation in terms of space (regional dialects) directly reflects changes along the temporal dimension. That interpretation of time is applied in the present book to velar fronting. Hence, dialects with a more restricted set of triggers (e.g. only nonlow front vowels) preserve an earlier historical stage than dialects with the full set of triggers (all coronal sonorants), which represent a later stage. The same point holds for dialects with a small set of targets (e.g. /x/) vs. those with an expanded set (e.g. /x ɣ/).

The phonologization of velar fronting occurred independently at more than one place (polygenesis). The most conclusive evidence against a single point of origin (monogenesis) comes from the many velar fronting islands. Whether or not monogenesis of polygenesis was correct for velar fronting in areas where velar fronting is the norm (i.e. most of Germany) is a question that cannot be known.

The conclusion was drawn is that the WGmc language represented Stage 1; hence, velar fronting at that time was absent. The reason for this conclusion is that the linguistic evidence points to velar fronting in the earliest attested stages,

namely OHG and OSax: Although velar fronting was not phonologized in a single place at a single point in time, it can be said that the change must have had at least one point of origin somewhere in an area corresponding to modern-day northwest Germany by the end of the ninth century. The reason for that time frame is that velar fronting predated the change from full vowel velar fronting triggers like [i] to schwa (Vowel Reduction), which was complete by the onset of MHG/MLG. Velar fronting was phonologized first in postsonorant position and the extension of that process to word-initial position came later. Evidence is strong that velar fronting is much older in CG (Rpn/MFr) dialects of OHG and is of a much more recent origin in LG (Wph) varieties of OSax.

When velar fronting was in the process of expanding through time and space to include a greater number of targets and triggers, velars ([x]) and palatals ([ç]) stood in a transparent (allophonic) relationship. Changes affecting the velar fronting target/trigger often interfered with the allophonic nature of velar fronting by producing opacity (Stage 3). For example, rules creating new velar targets (e.g. /ʀ/ > /x/) could exhibit underapplication if those new velars failed to undergo velar fronting. Likewise sound changes eliminating the front ([coronal]) trigger (e.g. /i/ > /ɑ/ or /r/ > /ʀ/) could lead to the historical overapplication of velar fronting. Overapplication occurred if the original front sound (e.g. /r/) once served as a trigger for velar fronting, but the original palatal allophone remained palatal even after the front trigger has been removed, e.g. /rx/ [rç] > /rç/ [rç]. The palatal fricative [ç] in the diminutive suffix *-chen* has a similar history: That [ç] was once preceded by a front vowel (cf. MHG *-ichen*), the loss of which led directly to the creation of the underlying palatal /ç/. That palatal is retained to the present day in those dialects with *-chen* [çən].

The emergence of palatal quasi-phonemes or phonemic palatals like /ç/ exemplifies what is referred to in the traditional literature on historical linguistics as a phonemic split, whereby the original trigger for a rule creating an allophone [A] from the phoneme /B/ causes the original allophone [A] to become the phoneme /A/.

Dialect-specific changes affecting the velar fronting target/trigger could interfere with the allophonic nature of velar fronting in other ways. In particular, the historically allophonic rule of velar fronting could undergo either rule loss or rule inversion. Rule loss is attested most clearly in the neighboring dialects of North Luxembourg (Nordösling), East Belgium (in and around Burg-Reuland), and West Central Germany (Lützkampen and Dahnen) with (alveolo)palatals (e.g. [ɕ]/[ç]) but no velars (e.g. [x]); hence, all historical velars in those places are realized as palatals. In that type of system the original rule of velar fronting was lost because earlier velars (e.g. /x/) were later restructured as phonemic palatals (e.g.

/ç/). Rule inversion is attested in a particular place (Neuendorf) where earlier palatal allophones ([ç] from /x/ in the context of front vowels) were restructured as underlying palatals and a rule retracting those sounds to velar ([x] from /ç/ in the context of back vowels). Rule inversion was shown to be a direct consequence of a sound change eliminating one of the earlier triggers for velar fronting.

18.4 Significance of the findings

The conclusions described in §18.1–§18.3 bear on several questions probed at length in the cross-linguistic research on phonology (diachronic and synchronic), language-specific research on German phonology, as well as typology.

The most significant contribution of the present work to linguistic scholarship is that it represents an in-depth investigation of the ways in which a single rule (velar fronting) can be phonologized in different dialects in different ways. It is my hope that the data in the Ortsgrammatiken and linguistic atlases which served as the basis for my treatment of velar fronting will inspire future linguists to conduct similar case studies on other types of changes.

The literature on historical German phonology has remained silent on the origin of the palatal allophone [ç] because earlier stages of German (and StG) spell [x] and [ç] the same way. The present book has demonstrated that it is possible to shed light on the origin of [ç] by putting aside orthography and by considering linguistic arguments.

This book sheds light on proposals made in the literature on the life cycle of a rule, e.g. Hyman (1976), Dressler (1976), Kiparsky (1995), Bermúdez-Otero (2007), Hyman (2013), Kiparsky (2015), Bermúdez-Otero (2015), Ramsammy (2015), Sen (2016), and Turton (2017). Although the works cited here (as well as those of scholars not mentioned) endorse a variety of different models, they generally agree that a purely phonetic (gradient) process becomes phonologized as an allophonic (categorical) rule whose effects later become opaque and then ultimately lost from the grammar entirely. That general trajectory is corroborated in the present cross-dialectal treatment of velar fronting, although there are various quirks in the German dialects investigated (referred to above) and commented on below.

The gradual increase in the number of targets/triggers when velar fronting was phonologized as an allophonic can be captured in the rule generalization model. That theory derives support from sound changes within and outside of Gmc, e.g. Davis et al. (1999), Bermúdez-Otero (2015). That the historical progression among triggers proceeds according to vowel height is corroborated in the

present study, although some rare places suggest that the original high front vocalic trigger may have expanded along alternate dimensions (roundedness, tenseness, orality, stress). The tentative analysis of the way in which rule generalization occurred in those unique communities can be corroborated in the future if parallel cases in independent languages become known.

The present treatment sheds light on how an originally transparent change can develop opaque outputs. Although the change from a transparent system to an opaque one has been observed by a number of linguists cited earlier, the types of opaque systems attested in the present book are much more fine-grained than the commonly occurring ones discussed in the literature. Consider the following examples:

One case of underapplication opacity comes in the form of neutral vowels. Precedent for neutral vowels outside of Gmc comes from Inuit dialects spoken in Alaska described and analyzed by Dresher (2009). However, the models cited above for the life cycle of a rule appear not to recognize that type of change. To the best of my knowledge Dresher's work is not referred to in the literature on the life cycle of a rule.

Overapplication as attested in German dialects was shown to be more subtle than what is typically assumed in the literature on phonemic splits in historical linguistics. The reason is that palatal allophones of velars can develop into either palatal quasi-phonemes or phonemic palatals. Palatal quasi-phonemes are not defined the same way as the vocalic quasi-phonemes proposed by Kiparsky (2015). A significant difference between the two approaches is that palatal quasi-phonemes in the present treatment always emerge as a direct consequence of the elimination of a (velar fronting) trigger and not before that trigger is lost (as per Kiparsky). What is more, only in my approach is it possible for the original velar to revert back to an underlying velar after the loss of the conditioning environment. That change was shown to be attested in several LG varieties, e.g. Schieder-Schwalenberg.

The case of rule loss mentioned above demonstrates that the expulsion of velar fronting from the grammar is not necessarily preceded by a morphologized and/or lexicalized version of velar fronting, contrary to what is sometimes postulated for the life cycle of a rule (Hyman 2013).

The one case involving the change from a historical rule of velar fronting to a later rule of retraction (Wd-Initial Palatal Retraction in Neuendorf) involves a true case of rule inversion and therefore poses a challenge for the claim made in McCarthy (1991) that true rule inversion does not exist. The fact that the inverted rule of retraction is apparently unattested cross-linguistically lends yet

additional support to the established claim that rule inversion can create crazy rules (e.g. Vennemann 1972, McCarthy 1991, Blevins 2004, Hall 2009b).

In terms of German phonology the present cross-dialectal study sheds light on how the distribution of [x] and [ç] in StG should best be analyzed. First, the two sounds are related by a rule fronting the velar to the palatal and not the reverse (contrary to many treatments proposed in the literature cited earlier, including my own). Second, the [ç] in the diminutive suffix *-chen* ([-çən]) and in the post-rhotic (/ʀ/) context are underlying palatals (/ç/). That synchronic treatment (which is corroborated by the history of [ç] in those two contexts) therefore accounts for the presence of [-çən] even after stems ending in a back vowel and [ç] after the vocalized (back) rhotic ([ɐ]). The occurrence of [ç] after [ɐ]/[ʀ] is not in any way natural, contrary to the assertion made by Robinson (2001). Finally, the investigation of German dialects undertaken in the previous chapters should put to rest Robinson's (2001) claim that velar fronting is a "low-level, phonetic rule" and his implicit claim that the rule is essentially the same in all German dialects.

The present study contributes to the literature on Velar Palatalization typology (e.g. Neeld 1973, Chen 1973, Bhat 1978, and especially Bateman 2007, 2011, 2007, Kochetov 2011, and Krämer & Urek 2016). That the front vowel triggers for velar fronting vary along the height dimension derives support from that literature. This book also corroborates the finding in the cross-linguistic studies referred to above that front vowel triggers for velar fronting only rarely refer to nonheight features. Another significant finding in the present study is that velar fronting can be triggered by front vowels and front (coronal) consonants. That finding does not appear to have support outside of German. The fricative targets for velar fronting in German dialects affect /x/ or /x ɣ/ but not /ɣ/ to the exclusion of /x/. That generalization is a corollary of similar claims made in the literature (e.g. Guion 1998, Hall & Hamann 2006 and Hall et al. 2006).

A typological oddity uncovered in the present study is the synchronic rule retracting an underlying palatal to velar in the back vowel context (Neuendorf), which represents one of the few known cases of "palatal to velar" assimilations. I am unaware of parallel examples outside of German.

18.5 Questions for future research

Any book of this magnitude will inevitably leave many questions open, and the present work is no exception. I describe below several general and specific topics touched on briefly in Chapters 2–17 that could be pursued in future research.

A number of open questions pertain specifically to phonological models. Some of those issues are described in (1–5). A question concerning phonetics is posed in (6).

(1) Structure of palatals: A complex place representation for palatals was adopted, according to which those segments are both [coronal] and [dorsal]. One could alternatively argue that palatals are simplex [coronal] or simplex [dorsal] segments (see §2.2.2 for references). No attempt was made in this book to compare and contrast the complex representation with simplex one. Whether or not there are significant differences among the various approaches is a question that needs to be determined.

(2) Structure of alveolopalatals: It was argued (Chapter 10) that alveolopalatal sounds like /ɕ/ have a structure that is identical to the corresponding palatals (/ç/) and that the difference between the two types of articulation involves rules of phonetic implementation. This approach is very different from the one proposed by authors who have looked at alveolopalatals in German (e.g. Herrgen 1986, Hall 2014a, Féry 2017) as well as the equivalent sounds in other languages (e.g. Rubach 1984 for Polish). It remains to be seen whether or not the phonetic implementation approach endorsed in Chapter 10 has more to offer than the ones cited above.

(3) Analysis of front vowels: A featural model was adopted in which front vowels are [coronal] and back vowels (including phonetically central vowels) are [dorsal]. That treatment can be contrasted with approaches (e.g. Chomsky & Halle 1968, Sagey 1986, Kostakis 2015). No attempt has been made in this book to compare the present treatment with those alternative ones, but this endeavor could be undertaken in the future.

(4) Adjacency: In the default case, the velar fronting target is adjacent to its trigger, but several patterns involving nonadjacency are well-attested in German dialects (§12.8.1). Much research in phonology has concerned itself with the topic of adjacency (e.g. Odden 1994); hence, one could consider how any of the patterns involving the nonadjacency of velar fronting targets and triggers fits into this overall research program.

(5) Opacity: This is a topic that has been discussed at length in theoretical phonology. A number of models have been proposed to account for various types of opacity, but those models have been shown to make different predictions. In particular, proponents of Optimality Theory have put forth a number of specific proposals concerning opaque rule interaction (see McCarthy 2002 for discussion). Since the present study has dealt with a num-

ber of cases involving both synchronic and diachronic opacity one could apply those formal models to the German data presented in this book.

(6) Non-velar fronting varieties: A number of places have been identified with velar sounds like [x] without a corresponding palatal. Little was said about that type of system, but it would be interesting to take a close look at the realization of those velars after all phonemic vowels and sonorant consonants in order to determine whether or not the degree of fronting in the coronal sonorant context in the phonetics matches the proposed steps for Stage 2 for the phonology. Is there a significant difference between non-velar fronting varieties, or do the same facts obtain in all of them?

Several open questions fit into the literature cited throughout this book on Velar Palatalization typology. Three such issues are described here:

(7) Palatal Retraction: The Eph variety once spoken in Neuendorf was shown to have regular alternations between [x] and [ç] requiring a synchronic rule converting the former (/ç/) into the latter ([x]) in word-initial position before back vowels (§8.5). That rule (Wd-Initial Palatal Retraction) was the product of rule inversion. A question for further research concerns languages with similar rules changing a palatal into a velar in the neighborhood of back sounds. As noted earlier, no examples are presently known to me, nor are such examples discussed in the Velar Palatalization literature. If such rules are attested were they the result of rule inversion or did they arise in some other way?

(8) Vocalic triggers for velar fronting: The triggers for the various versions of velar fronting are defined primarily in terms of vowel height. A few varieties were discussed in which the triggers are nonheight features, namely tenseness, rounding, and stress. A recent publication (Cardoso & Honeybone 2022) argues that vowel length is a factor in defining the set of triggers for velar fronting in Liverpool English. What is the entire range of parameters defining the set of triggers for velar fronting (Velar Palatalization) in the languages of the world?

(9) Adjacency: The dialects under investigation reveal various conditions on the type of segment that can intervene in nonadjacent velar fronting targets and triggers (§12.8.1). Are other languages attested with similar patterns, or is German unique?

The present work has left several questions unanswered concerning velar fronting in German dialects. The topic I find the most intriguing is stated here:

(10) Alveolopalatalization: This has been a change in progress primarily in CG from at least the late nineteenth century to the present day. It was proposed (Chapter 10) that there are two distinct stages, but a question for future work is whether or not this is the correct prediction for German varieties that are just starting to undergo alveolopalatalization. Does the phonologization of alveolopalatalization always involve those two stages, or are other stages attested?

Finally, the treatment of velar fronting begs several questions that in all likelihood have no answer. The three most intriguing questions in my view are the ones stated below. Recall that all three questions were mentioned briefly in previous chapters.

(11) Actuation Problem: Why was velar fronting phonologized in certain places (e.g. Germany) but not in others (e.g. most of German-speaking Switzerland and West Tirol)?

(12) Directionality: Why was velar fronting phonologized as a progressive spreading (and not as a regressive spreading) in all HG and LG varieties with that rule?

(13) Uniqueness: Velar fronting in the many varieties of HG and LG is a textbook case of assimilation, which can easily be expressed with phonological units. If this is the case, then why is it that the typological literature referred to earlier has not discovered a parallel case outside of German with the unique properties associated with velar fronting (e.g. target includes at least one velar fricative, triggers include coronal consonants, left-to-right spreading)?

Since I cannot offer answers to (11–13) I simply leave them open for the inquisitive reader to ponder.

Appendix A: Classification of High and Low German dialects

The classification of German dialects has been discussed at length in the literature on dialectology from the early nineteenth century up to the present day (e.g. Schmeller 1821, Götzinger 1836, Wenker 1877, Behaghel 1911, Reis 1912, Lenhardt 1916, Weise 1919, Sütterlin 1924, Mitzka 1943, Priebsch & Collinson 1958, Martin 1959, Schirmunski 1962, König 1978, Noble 1983, Wolf 1983, Schönfeld 1983, Wiesinger 1983b, Lameli 2013, Niebaum & Macha 2014, Herrgen & Schmidt 2019). There is consensus that dialects can be organized into two large categories, namely High German (HG) and Low German (LG). There is also agreement that the former can be split into two groups as well: Central German (CG) and Upper German (UG). The overall classification can therefore be depicted as in Figure A.1:

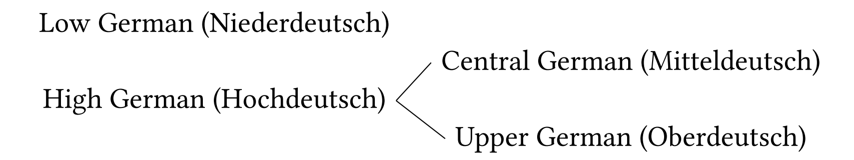


Figure A.1: High German vs. Low German

The three broad groupings depicted above (LG, CG, UG) can be further subdivided. Thus, CG and LG can be seen as consisting of a western and an eastern half, i.e. West Central German (WCG), East Central German (ECG), West Low German (WLG), and East Low German (ELG). UG can likewise be broken down into three groups: Alemannic (Almc), Bavarian (Bav) and East Franconian (EFr). The dialect groups just described (WCG, ECG, WLG, ELG, Almc, Bav, EFr) can be further decomposed into more fine-grained categories, although the proposals in the literature differ slightly from author to author. See Figures A.2 and A.3 for the expanded list of the LG and HG dialects that I will be adopting and making reference to throughout this book. The names for the specific categories within LG and HG are the one from Wiesinger (1983b), although he eschews the two

broad groupings WLG and ELG. The dialects listed in Figures A.2 and A.3 are indicated below on Map A.1.



Figure A.2: Branches of Low German

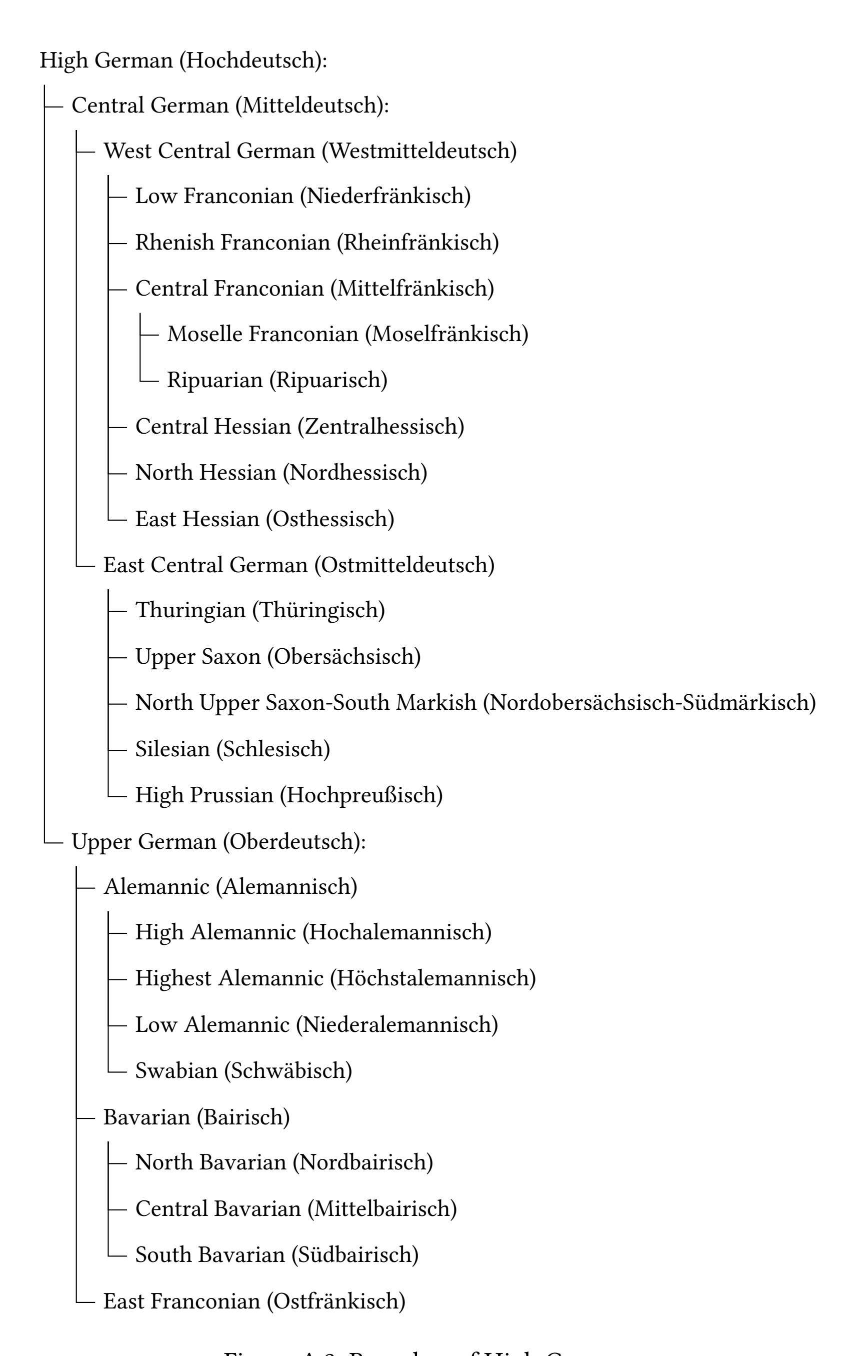


Figure A.3: Branches of High German



Map A.1: Dialects of High German and Low German. Dialect boundaries from Wiesinger (1983b).

Appendix B: Historical map



Map B.1: The German Empire 1871–1918. Source: https://commons.wikimedia.org/w/index.php?curid=3387306 CC BY-SA 3.0 by ziegelbrenner (Own drawing/Source of Information: Putzger – *Historischer Weltatlas*, 89. Auflage, 1965)

Appendix C: List of German dialects investigated

All varieties of German discussed in this book are given below in a series of tables classified into the dialects introduced in Appendix A. The classification is consistent with the one in Wiesinger & Raffin (1982) and Wiesinger (1987) for those works which appeared in 1985 or before.

In the first column of the tables listed below I identify for each variety the place and/or region where it is (or was) spoken, in the second column I indicate where that place or region is (or was) situated in terms of administrative divisions, and in the final column I list the original source. For each table the dialects are listed in chronological order according to the reference given in the final column. Some of those sources focus on a very specific place (e.g. a particular village), while others describe a cluster of villages, a city, or a larger region which might be coterritorial with an administrative division (e.g. a particular county). On the other hand, some of the original sources only give a vague indication of where the variety is spoken (e.g. by referring to areas between rivers or mountain ranges). Administrative divisions differ from country to country. If the dialect is spoken in Germany then the country is not indicated in the second column, but the state (Bundesland), county (Kreis/Landeskreis), and/or government district (Regierungsbezirk) are provided. The countries referred to below are abbreviated as follows: Austria (AT), Belgium (BE), Canada (CAN), the Czech Republic (CZ), Estonia (ES), France (FR), Hungary (HU), Italy (IT), Latvia (LA), Liechtenstein (LI), Luxembourg (LX), Mexico (MEX), the Netherlands (NL), Poland (PO), Romania (RO), Russia (RUS), Slovakia (SLK), Slovenia (SL), Switzerland (CH), Ukraine (UKR), and the United States of America (USA). For those countries I only occasionally include the respective administrative divisions. For all dialects once spoken in the eastern provinces of pre-1945 Germany – East Pomeranian (EPo), Low Prussian (LPr), High Prussian (HPr), Silesian (Sil) – the original names of the province, county and city/town are provided. For all other dialects I list the current name of the respective county. The modern German states and pre-1945 provinces are abbreviated according to the final column of the first table.

Table C.1: Modern States (Bundesländer) of Germany and pre-1945 provinces (Provinzen) of the German Empire

State (German)	State (English)	Abbv.
Baden-Württemberg	Baden-Württemberg	BWb
Bayern	Bavaria	Bvr
Brandenburg	Brandenburg	Brbg
Bremen	Bremen	Brm
Hamburg	Hamburg	Hbg
Hessen	Hesse	Hss
Mecklenburg-Vorpommern	Mecklenburg-Vorpommern	MVpm
Niedersachsen	Lower Saxony	LSxn
Nordrhein-Westfalen	North Rhine-Westphalia	NRW
Rheinland-Pfalz	Rhineland-Palatinate	RnPl
Saarland	Saarland	Srd
Sachsen	Saxony	Sxn
Sachsen-Anhalt	Saxony-Anhalt	SxAn
Schleswig-Holstein	Schleswig-Holstein	SHst
Thüringen	Thuringia	Thra
Province (German)	Province (English)	Abbv.
Ostpommern	East Pomerania	EPmr
Ostpreußen	East Prussia	EPr
Posen	Posen	Pos
Schlesien	Silesia	Sil
Westpreußen	West Prussia	WPr

Table C.2: High(est) Alemannic

Place/Region	Administ. Division	Source
Kerenzen (Glarus Nord)	CH; Glarus	Winteler (1876)
St. Stephan	CH; Bern	Zahler (1901)
Hohenems	AT; Vorarlberg	Seemüller (1909a)
Lauterach, Nenzing	AT; Vorarlberg	Schneider & Marte (1910)

Place/Region	Administ. Division	Source
Urserental (area around Realp)	CH: Uri	Abegg (1910)
Kesswil	CH: Thurgau	Enderlin (1910)
Todtmoos-Schwarzenbach	BWb; Kreis Waldshut	Kaiser (1910)
Appenzell	CH; Appenzell Innerrhoden	Vetsch (1910)
Visperterminen	CH; Valais	Wipf (1910)
In and around St. Gallen	CH; St. Gallen	Hausknecht (1911)
Rheintal	CH; St. Gallen	Berger (1913)
Nufenen, Vals; Leissigen, Frutigen, Saanen	CH: Grisons; CH: Bern	Gröger (1914a,b,c,d,e)
Entlebuch	CH; Lucern	Schmid (1915)
Glarus	CH; Glarus	Streiff (1915)
Toggenburg	CH; St. Gallen	Wiget (1916)
Jaun	CH; Freiburg	Stucki (1917)
Obersaxen (Mundaun)	CH; Grisons	Brun (1918)
Bündner Herrschaft (Maienfeld, Fläsch, Malans, Jenins)	CH; Grisons	Meinherz (1920)
Berner Seeland (area around Biel)	CH; Bern	Baumgartner (1922)
Vandans	AT; Vorarlberg	Jutz (1922)
Zürcher Oberland	CH; Zürich	Weber (1923)
South Vorarlberg; LI	AT; Vorarlberg; LI	Jutz (1925)
Markgräflerland	BWb; Freiburg	Beck (1926)
Sensebezirk and the Southeast Seebezirk	CH; Freiburg	Henzen (1927)

Place/Region	Administ. Division	Source
Lötschental	CH; Valais	Henzen (1928, 1932)
Area around Schächental	CH; Uri	Clauss (1929)
Schanfigg	CH; Grisons	Kessler (1931)
Mutten	CH; Grisons	Hotzenköcherle (1934)
Schaffhausen	CH: Schaffhausen	Wanner (1941)
Upper Valais	CH: Valais	Rübel (1950)
Walensee-Seeztal	CH: Grisons, Glarus	Trüb (1951)
Brienz	CH: Bern	Susman Schulz (1951)
Bern	CH: Bern	Keller (1961)
Vorarlberger Rheintal (Dornbirn, Hohenems,Lustenau)	AT; Vorarlberg	Gabriel (1963)
Jestetten	BWb	Keller (1963)
Kreis Feldkirch	AT; Vorarlberg	Bethge & Bonnin (1969)
Bellwald	CH; Valais	Schmid (1969)
Brig-Gris	CH; Valais	Werlen (1977)
Area between Thun and Jura	CH; Bern	Marti (1985)
Bosco Gurin	CH; Tessin	Russ (2002)
Zürich	CH; Zürich	Fleischer & Schmid (2006)
Kleinwalsertal, Damülser Tal, Tal der Bregenzer Ache, Großes Walsertal, Laternsertal; Triesenberg	AT; Vorarlberg LI	VALTS
Upper Valais, Southwest Bernese Oberland, St. Antönien	CH; Valais, Bern, Grisons	SDS

Table C.3: Low Alemannic

Place/Region	Administ. Division	Source
Münsterthal	FR; Alsace	Mankel (1886)
Ottenheim (Schwanau)	BWb; Ortenaukreis	Heimburger (1887)
Basel	CH; Basel-Stadt	Heusler (1888)
Forbach	BWb; Landkreis Rastatt	Heilig (1897)
Colmar	FR; Alsace	Henry (1900)
Oberschopfheim (Friesenheim)	BWb; Ortenaukreis	Schwend (1900)
St. Georgen	BWb; Schwarzwald-Baar-Kreis	Ehret (1911)
Rheinbischofsheim (Rheinau)	BWb; Ortenaukreis	Weik (1913)
Oberweier (Bühl)	BWb; Landkreis Rastatt	Wasmer (1915, 1916a,b)
Area between Renchtal and Schuttertal	BWb; Ortenaukreis	Kilian (1935)
Freiburg im Breisgau	BWb	Eckerle (1936)
Northwest Switzerland	CH; Basel-Stadt	Schläpfer (1956)
Barr	FR; Alsace	Keller (1961)
Blaesheim	FR; Alsace	Philipp (1965)
Mulhouse	FR; Alsace	Bethge & Bonnin (1969)
Metzeral	FR; Alsace	Zeidler (1978)
Mittelbaden (large area between Baden-Baden and Lahr)	BWb	Schrambke (1981)
Breisgau	BWb	Klausmann (1985a,b)
Colmar	FR; Alsace	Klausmann (1985a,b)
Benfeld	FR; Alsace	Rünneburger (1985)

Place/Region	Administ. Division	Source
Urach (Vöhrenbach), Titisee-Neustadt	BWb; Schwarzwald-Baar-Kreis, Landkreis Breisgau-Hochschwarzwald	E.M. Hall (1991a,b)
Mortzwiller, Oberhergheim, Thanvillé, Weiterswiller, Lembach	FR	ALA

Table C.4: Swabian

Place/Region	Administ. Division	Source
Horb am Neckar	BWb; Landkreis Freudenstadt	Kauffmann (1887, 1890)
Reutlingen	BWb; Landkreis Reutlingen	Wagner (1889)
Münsingen	BWb; Landkreis Reutlingen	Bopp (1890)
Villingen-Schwenningen	BWb; Schwarzwald-Baar-Kreis	Haag (1898)
Ries	Bvr: Swabia	Schmidt (1898)
Mühlingen	BWb; Landkreis Konstanz	Müller (1911)
Liggersdorf (Hohenfels)	BWb; Landkreis Konstanz	Dreher (1919)
Pforzheim	BWb; Pforzheim	Sexauer (1927)
Blaubeuren	BWb; Alb-Donau-Kreis	Strohmaier (1930)
Area around Herrenberg	BWb; Landkreis Böblingen	Zinser (1933)

Place/Region	Administ. Division	Source
Staudengebiet (southwest of Augsburg)	Bvr: Swabia	Moser (1936)
Dreistammesecke	Bvr: Swabia	Nübling (1938)
Area around Bavendorf (Ravensburg)	BWb; Landkreis Ravensburg	Schöller (1939)
Beuren	BWb; Landkreis Wangen	Bausinger & Ruoff (1959)
Erdmannsweiler; Neckar- und Donaugebiet	BWb; Schwarzwald-Baar-Kreis	Besch (1961)
Freudenstadt	BWb; Landkreis Freudenstadt	Baur (1967)
Memmingen	Bvr; Swabia	Hufnagl (1967)
Kreis Balingen	BWb	Bethge & Bonnin (1969)
Graben	Bvr; Landkreis Augsburg	König (1970)
Large area between Augsburg and Donauwörth	Bvr; Landkreis Augsburg, Landkreis Donau-Ries	Ibrom (1971)
Stuttgart	BWb; Stuttgart	Frey (1975)
Tuningen, Donaueschingen	BWb; Schwarzwald-Baar-Kreis	E.M. Hall (1991a,b)
Ebersbach (near Kaufbeuren)	Bvr; Swabia	SBS
Büßlingen (Tengen), Überlingen, Wangen	BWb; Landkreis Konstanz; Bodenseekreis; Landkreis Ravensburg	SSA

Place/Region	Administ. Division	Source
Gerstetten, Sontheim an der Brenz, Rudersberg	BWb; Landkreis Heidenheim; Rems-Murr-Kreis	SNBW
Wangen im Allgäu (Wangen im Allgäu)	BWb; Landkreis Ravensburg	VALTS

Table C.5: South Bavarian

Place/Region	Administ. Division	Source
Imst	AT; Tyrol	Schatz (1897)
Tyrol	AT; Tyrol	Schatz (1903)
Silltal	AT; Tyrol	Egger (1909)
Samnaun	CH; Grisons	Gröger (1924)
Area around Meran (Naturns, Passeiertal)	IT; South Tyrol	Insam (1936)
St. Ruprecht bei Villach	AT; Carinthia	Kurath (1965)
Imst	AT; Tyrol	Hathaway (1979)
Graz, Innsbruck	AT; Styria, Tyrol	Moosmüller (1991)
Garmisch-Partenkirchen	Bvr; Upper Bavaria	Stein-Meintker (2000)
Laurein	IT; South Tyrol	Kollmann (2007)
Zillertal; Tauferer Tal, Ultental, Eisacktal	AT; Tyrol IT; South Tyrol	TSA
Ötztal; Passeiertal	AT; Tyrol IT; South Tyrol	VALTS

Table C.6: Central Bavarian

Place/Region	Administ. Division	Source
Vienna	AT	Gartner (1900)
Rot-Tal	Bvr; Lower Bavaria	Schwäbl (1903)
Loosdorf	AT; Lower Austria	Seemüller (1908a)
St. Georgen an der Gusen	AT; Upper Austria (Mühlviertel)	Seemüller (1909d)
Pilgersham	AT; Upper Austria (Innkreis)	Seemüller (1909c)
Marchfeld	AT; Upper Austria	Pfalz (1911)
Neckenmarkt	AT; Burgenland	Bíró (1918)
Upper Austria	AT; Upper Austria	Haasbauer (1924)
Hausruckviertel	AT; Upper Austria	Mindl (1924/1925)
Böhmerwald (broad area to the northeast of Passau)	Bav, CZ	Kubitschek (1926)
Freutsmoos	Bvr; Upper Bavaria	Kufner (1957)
Munich	Bvr	Kufner (1957)
Broad area ca. 80km southeast of Munich and 40km northwest of Salzburg	Bvr	Kufner (1960)
Linz and Gmünden	AT	Keller (1961)
Area between Isar and Inn rivers and Austrian border (Kiefersfelden, Isarwinkel)	Bvr; Upper Bavaria	Maier (1965)
Munich	Bvr	Bethge & Bonnin (1969)
Großberghofen (Erdweg)	Bvr; Upper Bavaria	Gladiator (1971)
Large area between Augsburg and Aichach	Bvr; Swabia	Ibrom (1971)

Place/Region	Administ. Division	Source
Area in western Hungary at the confluence of the Danube and Raab Rivers	HU	Manherz (1977)
Hallertau	Bvr; Upper Bavaria, Lower Bavaria	Zehetner (1978)
Vienna	AT	Moosmüller (1987)
Salzburg, and Vienna	AT	Moosmüller (1991)
Ramsau am Dachstein	AT; Styria	Noelliste (2017)
Grafrath, Weilheim	Bvr; Upper Bavaria	SBS
Many place in Lower Bavaria	Bvr; Lower Bavaria	SNiB

Table C.7: North Bavarian

Place/Region	Administ. Division	Source
West Bohemia	Bvr, CZ	Gradl (1895)
Nürnberg	Bvr; Central Franconia	Gebhardt (1907)
Egerland	Bvr, CZ	Eichhorn (1908)
Eisendorf	CZ	Seemüller (1908c)
Untereichenbach (Schwabach)	Bvr; Central Franconia	Hain (1936)
Asch (Westsudetenland)	CZ	Gütter (1962a)
Schönbach (Westsudetenland)	CZ	Gütter (1962b)
Lauterbach (Westsudetenland)	CZ	Gütter (1963b)
Graslitz (Westsudetenland)	CZ	Gütter (1963a)
Bergstetten (Laaber)	Bvr; Upper Palatinate	Dozauer (1967)

Place/Region	Administ. Division	Source
Rezat-Altmühl (area to southwest of Nürnberg)	Bvr; Central Franconia	Schödel (1967)
Kreis Wunsiedel; Kreis Schwabach	Bvr; Upper Franconia; Central Franconia	Bethge & Bonnin (1969)
Windischeschenbach	Bvr; Upper Palatinate	Denz (1977)
Kallmünz	Bvr; Upper Palatinate	Götz (1987)
Eslarn	Bvr; Upper Palatinate	Bachmann (2000)
Raitenbuch, Dettenheim (Weissenburg), Mörnsheim	Bvr; Central Franconia, Upper Bavaria	SBS
Heuberg (Hilpoltstein), Ebenried (Allersberg)	Bvr; Central Franconia	SMF
Zinzenzell, Herrnsaal (Kehlheim), Atting	Bvr; Lowr Bavaria	SNiB
Miltach	Bvr; Upper Palatinate	SNOB

Table C.8: South Bavarian island

Place/Region	Administ. Division	Source
Erdmannsdorf/Zillertal	Sil; Kreis Hirschberg/AT; Tyrol	Siebs (1906)

Table C.9: East Franconian

Place/Region	Administ. Division	Source
Schöneck	Sxn; Vogtlandkreis	Hedrich (1891)
Pfersdorf (Hildburghausen)	Thra; Landkreis Hildburghausen	Hertel & Hertel (1902)
Heilbronn	BWb	Braun (1906)
Wachbach (Bad-Mergentheim)	BWb; Main-Tauber-Kreis	Dietzel (1908)
Vogtland (Trieb)	Sxn; Vogtlandkreis	Gerbet (1908)
Klein-Allmerspann (Gerabronn)	BWb; Landkreis Schwäbisch Hall	Blumenstock (1911)
Bamberg	Bvr	Batz (1911)
Rot-Tal (area to the south of Schwäbisch Hall)	BWb; Landkreis Schwäbisch Hall	Knupfer (1912)
Frankenland (Königheim, Steinbach bei Wertheim, Höpfingen)	BWb; Main-Tauber-Kreis, Neckar-Odenwald-Kreis	Heilig (1912)
Bonnland	Bvr; Lower Franconia	M. Schmidt (1912b)
Kleinschmalkalden (Floh-Seligenthal)	Thra; Landkreis Schmalkalden-Meiningen	Dellit (1913)
Schmalkalden	Thra; Landkreis Schmalkalden-Meiningen	Kaupert (1914)
Gaisbach	BWb; Hohenlohekreis	Sander (1916)
Fichtelgebirge (area between Bayreuth and Plauen)	Bvr, Sxn	Meinel (1932)

Place/Region	Administ. Division	Source
Schefflenz	BWb; Neckar-Odenwaldkreis	Roedder (1936)
Frankenwald	Bvr; Upper Franconia	Werner (1961)
Suhl	Thra	Kober (1962)
Waldau (Schleusingen)	Thra; Landkreis Hildburghausen	Bock (1965)
East Franconia (area north of Bayreuth)	Bvr	Steger (1968)
Spessart	Bvr	Hirsch (1971)
West Central Franconia	Bvr	Diegritz (1971)
Obermainraum (area between Bamberg and Bayreuth)	Bvr; Upper Franconia	Trukenbrod (1973)
In and around Heilbronn	BWb	Jakob (1985)
Weingarts (Kunreuth)	Bvr; Upper Franconia	Schnabel (2000)

Table C.10: East Hessian

Place/Region	Administ. Division	Source
Bad Salzungen	Thra; Wartburgkreis	Hertel (1888)
Bad Hersfeld	Hss; Landkreis Hersfeld-Rotenburg	Salzmann (1888)
Rhöntal (Eichenzell, Dipperz, Margretenhaun)	Hss, Bvr	Glöckner (1913)
Fulda	Hss; Landkreis Fulda	Noack (1938)

Place/Region	Administ. Division	Source
Broad area in and around Bad Hersfeld	Hss; Landkreis Hersfeld-Rotenburg	Martin (1957)
Hintersteinau	Hss; Main-Kinzig-Kreis	Müller (1958a)
Werra-Fuldaraum (area in and around Hünfeld)	Hss	Weber (1959)
Schlitzerland (Area around Schlitz)	Hss; Vogelbergkreis	Krafft (1969)
Fuldaer Land (Kreis Fulda, Kreis Hünfeld)	Hss	Wegera (1977)
Bad Salzschlirf	Hss; Landkreis Fulda	Post (1985)
Petersberg (Fulda)	Hss; Landkreis Fulda	Schwarz (1992)
Area in and around Fulda	Hss; Landkreis Fulda	Dingeldein (1995)

Table C.11: Central Hessian

Place/Region	Administ. Division	Source
Naunheim (Wetzlar)	Hss; Lahn-Dill-Kreis	Leidolf (1891)
Großen-Buseck bei Gießen	Hss; Landkreis Gießen	Wagner & Horn (1900)
Atzenhain (Mücke), Grünberg	Hss; Vogelsbergkreis, Landkreis Gießen	Knauss (1906)
Schlierbach (Bad Endbach)	Hss; Landkreis Marburg-Biedenkopf	Schaefer (1907)

Place/Region	Administ. Division	Source
Friedberg	Hss; Wetteraukreis	Reuß (1907)
Marburg	Hss; Landkreis Marburg-Biedenkopf	Freund (1910)
North Pfahlgraben (area south of Gießen)	Hss; Landkreis Limburg-Weilburg	Faber (1912)
Wissenbach (Eschenburg)	Hss; Lahn-Dill-Kreis	Kroh (1915)
Frankfurt am Main	Hss	Rauh (1921)
Selters bei Weilburg	Hss; Landkreis Limburg-Weilburg	Schwing (1921)
Langenselbold (Hanau)	Hss; Main-Kinzig Kreis	Siemon (1922)
Hanau	Hss; Main-Kinzig-Kreis	Urff (1926)
Wetterfeld (Laubach)	Hss; Landkreis Gießen	Schudt (1927)
Ebsdorf (Ebsdorfergrund)	Hss; Landkreis Marburg-Biedenkopf	Bender (1938)
Weidenhausen (Gladenbach)	Hss; Landkreis Marburg-Biedenkopf	Friebertshäuser (1961)
In and around Mammolshain (Königstein im Taunus)	Hss; Hochtaunuskreis	Schnellbacher (1963)
Area around Marburg	Hss; Landkreis Marburg-Biedenkopf	Spenter (1964)
Frankfurt am Main	Hss	Bethge & Bonnin (1969)

Place/Region	Administ. Division	Source
Erbstadt (Nidderau)	Hss; Main-Kinzig-Kreis	Schudt (1970)
Central Vogelsberg	Hss	Hasselbach (1971)
Central Hesse (area between Gießen and Marburg)	Hss	Hasselberg (1979)
Frankfurt am Main	Hss	Féry (2017)

Table C.12: North Hessian

Place/Region	Administ. Division	Source
Blankenheim (Bebra)	Hss; Landkreis Hersfeld-Rotenburg	Dittmar (1891)
Loshausen-Zella (Willingshausen)	Hss; Schwalm-Eder-Kreis	Schoof (1913a,b,c)
Amtshausen (Bad Laasphe)	NRW; Kreis Siegen-Wittgenstein	Hackler (1914)
Kreis Alsfeld	Hss	Heidt (1922)
Oberellenbach (Alheim)	Hss; Landkreis Hersfeld-Rotenburg	Hofmann (1926)
Rauschenberg	Hss; Landkreis Marburg-Biedenkopf	Bromm (1936)
Loshausen (Willingshausen)	Hss; Schwalm-Eder-Kreis	Corell (1936)
Niederhessen (area south of Kassel)	Hss	Hofmann (1940)
Battenberg (Eder), Bad Wildungen	Hss; Landkreis Waldeck-Frankenberg	Martin (1942)

Place/Region	Administ. Division	Source
Kassel	Hss	Müller (1958b)
Siegerland/Eichsfeld	Hss; Landkreis Waldeck-Frankenberg	Möhn (1962)
Holzhausen am Reinhardswald (Immenhausen)	Hss; Landkreis Kassel	Arend (1991)

Table C.13: Rhenish Franconian

Place/Region	Administ. Division	Source
Mainz	RnPl	Reis (1892)
Southeast Palatinate	RnPl	Heeger (1896)
Handschuhsheim (Heidelberg)	BnWb	Lenz (1900)
Zaisenhausen	BnWb; Landkreis Karlsruhe	Wanner (1907, 1908)
Ober-Flörsheim	RnPl; Landkreis Alzey-Worms	Haster (1908)
Beerfelden	Hss; Odenwaldkreis	Wenz (1911)
Mönchzell (Meckesheim)	BnWb; Rhein-Neckar-Kreis	Reichert (1914)
Warmsroth	RnPl; Landkreis Bad Kreuznach	Martin (1922)
Kaulbach	RnPl; Landkreis Kusel	Christmann (1927)
Ludwigshafen am Rhein	RnPl	Krell (1927)
Spessart (Ettlingen)	BnWb; Landkreis Karlsruhe	Lauinger (1929)

Place/Region	Administ. Division	Source
Odenwald (Zell im Mümlingtal, Bad König)	Hss	Freiling (1929)
Heppenheim	Hss; Kreis Bergstrasse	Seibt (1930)
Plankstadt	BnWb; Rhein-Neckar-Kreis	Treiber (1931)
Saarbrücken	Sld	Kuntze (1932)
Speyer	RnPl	Waibel (1932)
Pfungstadt	Hss; Landkreis Darmstadt-Dieburg	Grund (1935)
Vorderpfalz (Nußdorf)	RnPl; Landau	Bertram (1937)
Eberbach	BnWb; Rhein-Neckar-Kreis	Kilian (1951)
South Odenwald/Ried	Hss; Odenwaldkreis	Bauer (1957)
Darmstadt	Hss	Keller (1961)
Oftersheim	BnWb; Rhein-Neckar-Kreis	Liébray (1969)
Zweibrücken	RnPl	Castleman (1975)
South Palatinate (Dahn, Wilgartswiesen, Iggelbach)	RnPl; Landkreis Südwestpfalz, Landkreis Bad Dürkheim	Karch (1980)
Wackernheim (Ingelheim am Rhein), Nackenheim, Alzey, Wallertheim, Bechtheim	RnPl; Landkreis Mainz-Bingen, Landkreis Alzey-Worms	Karch (1981)
Saarbrücken	Sld	Steitz (1981)
Gabsheim	RnPl; Landkreis Alzey-Worms	Post (1987)

Place/Region	Administ. Division	Source
Großrosseln	Sld	Pützer (1988)
Michelstadt	Hss; Odenwaldkreis	Durrell & Davies (1989)
Langatte, Laning, Schorbach	FR	ALLG
Remschingen, Bretten	BnWb; Enzkreis; Landkreis Karlsruhe	SNBW
Schneppenbach, Wintersbach	Bvr; Lower Franconia	SUF

Table C.14: Moselle Franconian

Place/Region	Administ. Division	Source
Prüm	RnPl; Eifelkreis Bitburg-Prüm	Büsch (1888)
Birkenfeld	RnPl; Landkreis Birkenfeld	Baldes (1896)
Merzig	Sld; Kreis Merzig-Waden	Fuchs (1903)
Lubeln; Kanton Falkenberg	FR	Tarral (1903)
Siegerland (area around Siegen)	NRW: Kreis Siegen-Wittgenstein	Reuter (1903)
Sehlem	RnPl; Landkreis Bernkastel-Wittlich	Ludwig (1906)
Kenn	RnPl; Landkreis Trier-Saarburg	Thomé (1908)
Sörth	RnPl; Landkreis Altenkirchen	Hommer (1910)
Vianden	LX	Engelmann (1910)

Place/Region	Administ. Division	Source
Laubach	RnPl; Landkreis Cochem-Zell	Wimmert (1910)
Kreis Ottweiler (area in and around Hasborn)	Sld	Scholl (1912)
Saarhölzbach (Mettlach)	Sld	Thies (1912)
Ihren (Winterspelt), Sellerich, Weinsheim	RnPl; Eifelkreis Bitburg-Prüm	Meyers (1913a,b)
Arzbach	RnPl; Rhein-Lahn-Kreis	Bach (1921)
Arel	BE	Bertrang (1921)
Saarlouis	Sld	Lehnert (1926)
Echternach	LX; Echternach	Palgen (1931)
Ittersdorf (Wallerfangen)	Sld; Landkreis Saarlouis	Pallier (1934)
Nordösling	LX; Clervaux	Bruch (1952)
Kreis Wittlich	RbPl	Bethge & Bonnin (1969)
East Belgium (Burg-Reuland)	BE	Hecker (1972)
Area around Burg-Reuland	BE	Cajot & Beckers (1979)
Bell (Mendig)	RnPl; Landkreis Mayen-Koblenz	Mattheier (1987)
Horath (Hunsrück)	RnPl; Landkreis Bernkastel-Wittlich	Reuter (1989)
Beuren(near Trier)	RnPl	Peetz (1989)
Lxm	LX	Gilles (1999)
Montabaur	RnPl: Westerwaldkreis	Féry (2017)
Lützkampen/Dahnen	RnPl; Eifelkreis Bitburg-Prüm	MRhSA

Place/Region	Administ. Division	Source
Elzange	FR	ALLG

Table C.15: Ripuarian

Place/Region	Administ. Division	Source
Aix-la-Chapelle (Aachen)	NRW	Rovenhagen (1860)
Cologne	NRW	Wahlenberg (1877)
Krefeld	NRW	Röttsches (1877)
Werden (Essen)	NRW	Koch (1879)
Remscheid	NRW	Holthausen (1885a,b)
Ronsdorf (Wuppertal)	NRW	Holthaus (1887)
Mülheim an der Ruhr	NRW	Maurmann (1889)
Aachen	NRW	Jardon (1891)
Large area in western part of Rpn dialect area	NRW	Schmitz (1893)
Aegidienberg (Bad Honnef)	NRW; Rhein-Sieg Kreis	Müller (1900)
Erftgebiet	NRW	Münch (1904 [1970])
Wermelskirchen	NRW; Rheinisch-Bergischer Kreis	Hasenclever (1905)
In and around Cologne	NRW	Müller (1912)
Dülken (Viersen)	NRW	Frings (1913)
Broad area in the northeastern part of the Ripuarian dialect area	NRW	Lobbes (1915)
Niederembt (Elsdorf)	NRW; Rhein-Erft-Kreis	Grass (1920)

Place/Region	Administ. Division	Source
Düsseldorf	NRW	Zeck (1921)
Schelsen (Grevenbroich, Mönchengladbach)	NRW; Rhein-Kreis Neuss	Greferath (1922)
Oberste Zeith (Seelscheid)	NRW; Rhein-Sieg-Kreis	Mackenbach (1924)
Broad area in Oberbergischer Kreis, e.g. Eckenhagen, Berghausen	NRW; Oberbergischer Kreis	Branscheid (1927)
Kreis Eupen	BE	Welter (1929)
Montzen	BE	Welter (1933)
Schlebusch (Leverkusen)	NRW	Bubner (1935)
Aachen	NRW	Welter (1938)
Cologne	NRW	Heike (1964)
Gleuel (Hürth)	NRW; Rhein-Erft-Kreis	Heike (1970)
Moresnet (Plombières)	BE	Jongen (1972)
East Belgium (Elsenborn, Wallerode, Recht, St. Vith, Manderfeld)	BE	Hecker (1972)
Burscheid	NRW; Rheinisch-Bergischen Kreis	Heinrichs (1978)
Area around St. Vith	BE	Cajot & Beckers (1979)
Krefeld	NRW	Bister-Broosen (1989)
Euskirchen, Dahlem, Monschau, Zülpich, Langerwehe, Nörvenich, Jülich, Bonn, Heinsberg, Mönchengladbach,	NRW	Cornelissen et al. (1989)
Rimburg	NL; Limburg	Hinskens (1992)

Place/Region	Administ. Division	Source
Düsseldorf/ Cologne (Lower Rhine German)	NRW	Hall (1993)
Erp (Erftstadt)	NRW; Rhein-Erft-Kreis	Kreymann (1994)
Niederbachem, Oberbachem (Wachtberg)	NRW; Rhein-Sieg-Kreis	Fuss (2001)

Table C.16: Low Franconian

Place/Region	Administ. Division	Source
Area between Geldern and Viersen	NRW	Ramisch (1908)
Homberg (Duisburg)	NRW	Meynen (1911)
Kalkar	NRW; Kreis Kleve	Hanenberg (1915)
Kreis Moers	NRW; Kreis Wesel	Bethge & Bonnin (1969)
Kleve	NRW	Stiebels (2013)

Table C.17: Thuringian

Place/Region	Administ. Division	Source
North Thuringia (in and around Nordhausen)	Thra; Landkreis Nordhausen	Schultze (1874)
Stiege (Oberharz)	SxAn; Landkreis Harz	Liesenberg (1890)
Eisenach	Thra	Flex (1893)
Bad Frankenhausen	Thra; Kyffhäuserkreis	Frank (1898)

Place/Region	Administ. Division	Source
Osterland (Oberschwöditz, between Zeitz and Naumburg)	SxAn; Burgenlandkreis	Trebs (1899)
Mansfeld	SxAn; Landkreis Mansfeld-Südharz	Hennemann (1901)
Leinefelde	Thra; Landkreis Eichsfeld	Hentrich (1905)
Altenburg	Thra; Landkreis Altenburger Land	Daube (1906)
Buttelstedt	Thra; Landkreis Weimarer Land	Kürsten & Bremer (1910)
Southwest Thuringia	Thra	Kürsten (1910, 1911)
Niddawitzhausen (Eschwege)	Hss; Werra-Meissner-Kreis	Rasch (1912)
Northeast Thuringia, southeast Sachsen-Anhalt	Thra, SxAn	Hankel (1913)
Eichsfeld	Northwest Thra	Hentrich (1920)
Honsteinisch (area north of Sondershausen)	Thra, SxAn	Rudolph (1924/1925)
Sondershausen	Thra; Kyffhäuserkreis	Schirmer (1932)
Gera	Thra	Dietrich (1957)
Unterellen (Gerstungen)	Thra; Wartburgkreis	Spangenberg (1962)
East Thuringian	Thra	Spangenberg (1974)
Dudenrode, Netra	Hss; Landkreis Witzenhausen, Landkreis Eschwege	Guentherodt (1982)
Ludwigsstadt	Bvr; Upper Franconia	Harnisch (1987)

Place/Region	Administ. Division	Source
Thuringian dialect overview	Thra	Spangenberg (1989)
Barchfeld (Barchfeld-Immelborn)	Thra; Wartburgkreis	Weldner (1991)
Itzgrund (area between Bamberg and Coburg)	Bvr; Upper Franconia	Spangenberg (1998)

Table C.18: Upper Saxon

Place/Region	Administ. Division	Source
Erzgebirge (Annaberg-Buchholz, Freiberg)	Sxn; Erzgebirgskreis, Landkreis Mittelsachsen	Goepfert (1878)
Leipzig	Sxn	Albrecht (1983)
Greiz	Thra; Landkreis Greiz	Hertel (1887)
Zwickau	Sxn; Landkreis Zwickau	Philipp (1897)
Brüx	CZ	Hausenblas (1898)
Zschorlau	Sxn; Erzgebirgskreis	Lang (1906)
Schokau (Starý Šachov)	CZ	Pompé (1907)
Saalkreis	SxAn	Bremer (1909)
Northwest Bohemia	CZ	Hausenblas (1914)
Large area between Dresden and Chemnitz (meißnisch)	Sxn	Große (1955)
Leipzig	Sxn	Große (1957)

Place/Region	Administ. Division	Source
West Lausitz	Sxn; Landkreis Bautzen, Landkreis Sächsische-Schweiz Osterzgebirge	Protze (1957)
Salzfurtkapelle (Zörbig)	SxAn; Landkreis Anhalt-Bitterfeld	Schönfeld (1958)
Area in and around Dresden	Sxn	Fleischer (1961)
Vorerzgebirge	Sxn	Bergmann (1965)
Large area, especially south of Chemnitz and Freiberg	Sxn	Becker (1969)
Kreis Oschatz (ca. 55km east of Leipzig)	Sxn	Bethge & Bonnin (1969)
Chemnitz	Sxn	Kahn & Weise (2013)

Table C.19: Silesian

Place/Region	Administ. Division	Source
Seifhennersdorf	Sxn; Landkreis Görlitz	Michel (1891)
Sebnitz	Sxn; Landkreis Sächsische-Schweiz Osterzgebirge	Meiche (1898)
Kieslingswalde	Sil; Kreis Habelschwerdt	Pautsch (1901)
Lehmwasser	Sil; Landkreis Waldenburg	Hoffmann (1906)
Schlesische Mundart	Sil; CZ; North Moravia; AT	von Unwert (1908)

Place/Region	Administ. Division	Source
Kreis Hirschberg (Riesengebirge), Alt-Waltersdorf bei Habelschwerdt (Grafschaft Glatz)	Sil	Graebisch (1912a,b)
Kunewald	Sil; CZ	Giernoth (1917)
Groβ-Schönau, Seifnehhersdorf, Sebnitz, Markersdorf	Sxn; Landkreis Görlitz	Wenzel (1919)
Reichenberg	CZ	Kämpf (1920)
East Bohemia	CZ	Festa (1925)
Römerstadt, Sternberg	Sil; Troppau	Rieger (1935)
North Moravia (Marschendorf, Kunzendorf, Schildberg, Nieder-Ullersdorf, Rokitnitz)	CZ	Weiser (1937)
Bremberg	Sil; Kreis Jauer	Halbsguth (1938)
Grafschaft Glatz	Sil; Kreis Glatz	Blaschke (1966)
Kay	Brbg; Kreis Züllichau-Schwiebus	Messow (1965)
Hohenelbe, Grulich, Bärn	Sil, CZ	SchlSA

Table C.20: North Upper Saxon-South Markish

Place/Region	Administ. Division	Source
Dubraucke (Eichwege)	Brbg; Landkreis Spree-Neiβe; Döbern	Goessgen (1902)
Aken (Elbe)	SxAn; Landkreis Anhalt-Bitterfeld	Bischoff (1935)

Place/Region	Administ. Division	Source
South Brandenburg	Brbg; Landkreis Elbe-Elster	Kieser (1963)
Friedersdorf (Doberlug-Kirchhain)	Brbg; Landkreis Elbe-Elster	Seibicke (1967)
Weidenhain (Dreiheide)	Sxn; Landkreis Nordsachsen	Krug (1969)
Berlin	Berlin	Bethge & Bonnin (1969)
Grassau (Schönewalde)	Brbg; Landkreis Elbe-Elster	Stellmacher (1973)
Wittenberg	SxAn; Landkreis Wittenberg	Langner (1977)
Berlin	Berlin	Schönfeld (1986, 2001)

Table C.21: High Prussian

Place/Region	Administ. Division	Source
Kreis Wormditt, Kreis Guttstadt, Kreis Heilsberg	EPr	Stuhrmann (1896)
WPr/EPr	general description of HPr	Ziesemer (1924)
Rollnau, Kahlau, Hagenau, Kreis Mohrungen	EPr	Kuck (1927)
Kreis Rosenberg	WPr; Kreis	Kuck (1933)
Reimerswalde	EPr; Kreis Heilsberg	Kuck & Wiesinger (1965)
Kahlau, Hagenau, Kreis Mohrungen, Kreis Heilsberg	EPr	Tessmann (1969)

Table C.22: North Low German

Place/Region	Administ. Division	Source
Greetsiel (Krummhörn)	LSxn; Landkreis Aurich	Hobbing (1879)
Burg (Dithmarschen)	SHst: Dithmarschen	Kohbrok (1901)
Oldenburg	LSxn; Oldenburg	vor Mohr (1904)
Lathen	LSxn; Landkreis Emsland	Schönhoff (1908)
Badbergen	LSxn; Landkreis Osnabrück	Vehslage (1908)
Bleckede	LSxn; Landkreis Lüneburg	Rabeler (1911)
Finkenwärder (Hamburg)	Hbg	Kloeke (1914)
Burg (Dithmarschen)	SHst: Dithmarschen	Stammerjohann (1914)
Stapelholm (Bergenhusen)	SHst; Kreis Schleswig-Flensburg	Sievers (1914)
Altengamme (Hamburg)	Hbg	Larsson (1917)
Hollenstedt; Jade	LSxn; Landkreis Harburg; LSxn; Landkreis Wesermarsch	Götze (1922)
Heide (Dithmarschen)	SHst	Jörgensen (1928/1929)
Kreis Herzogtum Lauenburg	SHst	Heigener (1937)
Diepenau (Samtgemeinde Uchte)	LSxn; Landkreis Nienburg	Schmeding (1937)
Borgstede (Varel)	LSxn; Landkreis Friesen	Feyer (1939)

Place/Region	Administ. Division	Source
Baden (Achim)	LSxn; Landkreis Verden	Feyer (1941)
Grambkermoor bei Bremen	Brm	Bollmann (1942)
Jadebusen	LSxn; Wilhelmshaven	Schmidt-Brockhoff (1943)
Hemmelsdorf; Kreis Eutin	SHst; Kreis Ostholstein	Pühn (1956)
Kirchwerder	Hbg	von Essen (1958)
Harburg	Hbg	Keller (1961)
Kreis Kiel	SHst	Bethge & Bonnin (1969)
Oldenburger Ammerland	LSxn; Oldenburg	Mews (1971)
Nordstrand	SHst	Willkommen (1999)
Altenwerder	Hbg	Höder (2010)

Table C.23: Westphalian

Place/Region	Administ. Division	Source
Soest	NRW; Kreis Soest	Holthausen (1886)
Kreis Lippe	NRW; Kreis Lippe	Hoffmann (1887)
Adorf (Diemelsee)	Hss; Landkreis Waldeck-Frankenberg	Collitz (1899)
Schieder-Schwalenberg	NRW; Kreis Lippe	Böger (1906)
Kirchspiel Courl (Dortmund)	NRW	Beisenherz (1907)
Elspe (Lennestadt)	NRW; Kreis Olpe	Arens (1908)
Hiddenhausen	NRW; Kreis Herford	Schwagmeyer (1908)

Place/Region	Administ. Division	Source
Area in and around Paderborn	NRW	Brand (1914)
Borken	NRW; Kreis Borken	Herdemann (1921 [2006])
Gütersloh	NRW; Kreis Gütersloh	Wix (1921)
Behringhausen (Castrop-Rauxel); Schinkel (Osnabrück)	NRW; Kreis Recklinghausen	Götze (1922)
Rhoden (Diemelstadt)	Hss; Landkreis Waldeck-Frankenberg	Martin (1925)
Plettenberg	NRW; Märkischer Kreis	Gregory (1934)
Mülheim/Ruhr, Byfang/Ruhr, Hamm/Lippe	NRW	Hellberg (1936)
Ostbevern	NRW; Kreis Warendorf	Holtmann (1939)
Southeast Sauerland	NRW	Schulte (1941)
Willingen, Sudeck (Diemelsee), Freienhagen (Waldeck)	Hss; Landkreis Waldeck-Frankenberg	Martin (1942)
Grafschaft Bentheim	LSxn; Landkreis Grafschaft Bentheim	Rakers (1944)
Altenluenne	LSxn; Landkreis Emsland	Borchert (1955)
Lüdenscheid	NRW; Märkischer Kreis	Frebel (1957)
Münster	NRW	Keller (1961)
Kreis Tecklenburg	NRW	Bethge & Bonnin (1969)

Place/Region	Administ. Division	Source
Nienberge (Münster)	NRW	Seymour (1970)
Riesenbeck (Hörstel)	NRW; Kreis Steinfurt	Bethge (1970)
Reelkirchen (Blomberg)	NRW; Kreis Lippe	Stellmacher (1972)
Laer	NRW; Kreis Steinfurt	Niebaum (1974, 1982)
Müschede (Arnsberg)	NRW; Hochsauer-landkreis	Niebaum et al. (1976)
Breckerfeld, Hagen, Iserlohn	NRW	Brandes (2011)

Table C.24: Eastphalian

Place/Region	Administ. Division	Source
Meinersen (Samtgemeinde Meinersen)	LSxn; Landkreis Gifhorn	Bierwirth (1890)
Börßum (Samtgemeinde Oderwald)	LSxn; Landkreis Wolfenbüttel	Heibey (1891)
Magdeburger Börde (Schnarsleben)	SxAn; Landkreis Börde	Roloff (1902)
Eilsdorf (Huy)	SaAn; Landkreis Harz	Block (1910)
Cattenstedt (Blankenburg)	SaAn; Landkreis Harz	Damköhler (1919)
Reinhausen (Gleichen)	LSxn; Landkreis Göttingen	Jungandreas (1926, 1927)
Ramlingen (Burgdorf)	LSxn; Landkreis Region Hannover	Jarfe (1929)
Lesse (Salzgitter)	LSxn; Landkreis Wolfenbüttel	Löfstedt (1933)

Place/Region	Administ. Division	Source
Dorste (Osterode)	LSxn; Landkreis Göttingen	Dahlberg (1934, 1937)
Dorste (Osterode), Hasede (Hildesheim)	LSxn; Landkreis Göttingen, Landkreis Hildesheim	Mackel (1939)
Dingelstedt am Huy (Huy)	SxAn; Landkreis Harz	Hille (1939)
Werratal (area surrounding Witzenhausen)	Hss; Werra-Meißner-Kreis	Hassel (1942)
Area around Braunschweig	LSxn	Pahl (1943)
Emmerstedt (Helmstedt)	LSxn	Brugge (1944)
Neuendorf (Teistungen)	Thra; Landkreis Eichsfeld	Schütze (1953)
Mascherode (Braunschweig)	LSxn	Bethge & Flechsig (1958)
Göddeckenrode, Isingerode	SxAn; Landkreis Harz LSxn; Landkreis Wolfenbüttel	Lange (1963)
Kreis Hannover, Kreis Wolfenbüttel	LSxn	Bethge & Bonnin (1969)
Kamschlaken (and several other nearby towns and villages)	LSxn; Osterode am Harz, Landkreis Göttingen	Göschel (1973)
Celle	LSxn	ACeM

Table C.25: Mecklenburgish-West Pomeranian

Place/Region	Administ. Division	Source
Ivenack-Stavenhagen	MVpm; Landkreis Mecklenburgische Seenplatte	Holst (1907)
Barth	MVpm; Landkreis Vorpommern-Rügen	Schmidt (1912a)
Wolgast	MVpm; Landkreis Vorpommern-Greifswald	Warnkross (1912)
West Mecklenburg	MVpm; Landkreis Nordwestmecklenburg	Kolz (1914)
South Mecklenburg	MVpm; Landkreis Ludwigslust-Parchim	Jacobs (1925a,b, 1926)
Rehna, Schwerin	MVpm	Teuchert (1927)
Kaarβen (Amt Neuhaus)	LSxn; Landkreis Lüneburg	Dützmann (1932)
Ratzeburg, Rostock, Lank (Lübtheen)	SHst, MVpm	Teuchert & Schmitt (1933)
Stargard (area to the north of Neustrelitz)	MVpm	Blume (1933a,b,c,d)
South Stargard	MVpm	Teuchert (1934)
Kreis Wismar	MVpm; Landkreis Nordwestmecklenburg	Bethge & Bonnin (1969)
Greifswald, Schwerin	MVpm	Prowatke (1973)
Survey of ELG (e.g. Teterow)	MVpm	Schönfeld (1989)

Table C.26: Brandenburgish

Place/Region	Administ. Division	Source
In and around Magdeburg	SxAn	Krause (1895)
Kreis Jerichow I (region in and around Möckern)	SxAn; Landkreis Jerichower Land	Krause (1896)
Besten	Brbg; Landkreis Dahme-Spreewald	Siewert (1907)
Neumark	PL	Teuchert (1907b,c)
Warthe (Uckermark)	Brbg; Landkreis Uckermark	Teuchert (1907a)
Prenden (Wandlitz)	Brbg; Landkreis Barnim	Seelmann (1908)
Neu-Golm (Bad Saarow)	Brbg; Landkreis Oder-Spree	Siewert (1912)
Ostmärkische Mundart (Kreise Arnswalde, Friedeberg)	PL	Seelmann (1913)
Strodehne (Havelaue)	Brbg; Landkreis Havelland	Hildebrand (1913)
Lüneburger Wendland	LSxn: Landkreis Lüchnow-Dannenberg	Selmer (1918)
Rebenstorf (Lübbow)	LSxn; Landkreis Lüchnow-Dannenberg	Götze (1922)
Letschin	Brbg; Landkreis Märkisch-Oderland	Teuchert (1930)
Jerichower Land	SxAn	Bathe (1932)
Kleinwusterwitz (Jerichow)	SxAn	Bathe (1937)
Arendsee (Altmark)	SxAn; Altmarkkreis-Salzwedel	Törnqvist (1949)

Place/Region	Administ. Division	Source
Hinzdorf (Wittenberge)	Brbg; Landkreis Prignitz	Bretschneider (1951)
Heckelberg	Brbg; Landkreis Märkisch-Oderland	Teuchert (1964)
Large area in the western part of Brandenburg	Brbg	Bathe (1965)
Schollene	SxAn; Landkreis Stendal	Gebhardt (1965), Schönfeld (1965)
Survey of ELG (e.g. Tempelfelde)	Brbg	Schönfeld (1989)

Table C.27: Central Pomeranian

Place/Region	Administ. Division	Source
Kreis Greifenhagen and Kreis Königsberg	PL	Brose (1955)
Burg Stargard	MVpm; Landkreis Mecklenburgische Seenplatte	Prowatke (1973)

Table C.28: East Pomeranian

Place/Region	Administ. Division	Source
Putzig (Posen)	PL	Teuchert (1913)
Kreis Konitz	WPr; Kreis Konitz	Semrau (1915a,b)
Lauenburg	EPmr; Kreis Lauenburg	Pirk (1928)
Kreis Schlawe	EPmr; Kreis Schlawe	Mahnke (1931)

Place/Region	Administ. Division	Source
Kreis Saatzig	EPmr; Kreis Saatzig	Kühl (1932)
Kreis Bütow, Kreis Rummelsburg	EPmr; Kreis Bütow, Kreis Rummelsburg	Mischke (1936)
Kreis Lauenburg, Kreis Stolp	EPmr; Kreis Lauenburg, Kreis Stolp	Stritzel (1937)
Kamnitz	EPmr; Kreis Bublitz	Tita (1921 [1965])
Sępóno Krajeńskie	WPr	Darski (1973)

Table C.29: Low Prussian

Place/Region	Administ. Division	Source
EPr	General descriptions of LPr	Gortzitza (1841), Lehmann (1842), Förstemann (1850), Fischer (1896), Kantel (1900), Betcke (1924), Ziesemer (1924), Schönfeldt (1977)
Alt-Thorn	EPr	Wagner (1912)
Königsberg	EPr; Kreis Königsberg	Mitzka (1919)
Danziger Nehrung	EPr	Mitzka (1922)
Willuhnen	EPr; Kreis Pillkallen	Natau (1937)
In and around Mandtkeim	EPr; Kreis Fischhausen	Bink (1953)
Bieberstein bei Barten	EPr	Tessmann (1966)

Table C.30: German-language islands

Place/Region	Administ. Division	Source
ES, LA	LG island (Baltic German)	Sallmann (1872), Mitzka (1923a,b), Masing (1926), Deeters (1939)
Burgberg, Mediasch, Bistritz, Schäßburg	MFr island (Transylvania Saxon) in RO	Scheiner (1887), Kisch (1893), Scheiner (1922), Klein (1927), Maurer (1959), Bruch (1966)
Hobgarten, Leibitz, Dobschau, Käsmark	CG island (Zipser German) in SLK	Lumtzer (1894, 1896), Gréb (1921), Kövi (1911), WbMD
Lusern, Giazza/Dreizehn Gemeinden, Sieben Gemeinden	SBav (Cimbrian) islands in Northeast IT	Bacher (1905), Schweizer (1939), Mayer (1971), Kranzmayer (1981), Tyroller (2003)
Mitterdorf, Suchener Tal, Suchen, Hinterberg, Klindorf, Niedermösel, Reichenau, Rodine, Hornberg	SBav island (Gottschee) in SL	Tschinkel (1908), Seemüller (1909b), Wolf (1982), Lipold (1984)
Altstadt, Langenlutsch, Rathsdorf, Hilbetten, Michelsdorf , Mährisch Hermersdorf, Vorder-Ehrnsdorf, Augezd, Kornitz, Rehsdorf, Rothmühl	HG island (Schönhengst) in CZ	Seemüller (1908b), Janiczek (1911), Graebisch (1915), Matzke (1918), Sandbach (1922), Appel (1963), Benesch (1979)

Place/Region	Administ. Division	Source
RUS, UKR, MEX, USA (Indiana, Missouri, Kansas, Oklahoma), CAN	LPr island (Plautdietsch)	Quiring (1928), Goerzen (1952), Lehn (1957), Mierau (1964), Moelleken (1966), Jedig (1966), Buchheit (1978), Loewen (1988), Naiditch (2005), Nieuweboer (1999), Siemens (2012), Cox et al. (2013), te Velde & Vosburg (2021)
North UKR	CHes island	Sokolskaja & Sinder (1930)
Jamburg (UKR)	NBav island	Schirmunski (1931)
Sathmar	HG island in RO	Moser (1937)
Libinsdorf	CG island in CZ	Weinelt (1940)
Many states on the East Coast and Midwest	German-language island (Pennsylvania German) in USA	Frey (1942), Reed (1947), Buffington & Preston (1954), Kelz (1971)
Zarz	Bav island in SL	Lessiak (1959)
USA (Texas)	German language island (Texas German, Texas Alsatian)	Gilbert (1963, 1964), Eikel (1966), Gilbert (1970), Boas (2009), Roesch (2012), LATG
Iglau	NBav island in CZ	Stolle (1969)
Milwaukee (USA) and Mucsi (HU)	Hes island in Wisconsin (USA)	Gommermann (1975)
Banat	German-language island (Banat Swabian) in RO	Barba (1982), Wolf (1987), Dama (1987), Mileck (1997)

Place/Region	Administ. Division	Source
Fersental	SBav island (Mòcheno) in Northeast IT	Rowley (1986)
Concordia	LG island in Missouri (USA)	Ballew (1997)
Issime, Gressoney, Alagna, Rima, Macugnaga	SBav islands in Northwest IT	SDS

Table C.31: Standard languages

Language	Source
Modern Standard German (StG)	Krech (1982), Mangold (2005)
Standard Swiss German (StSwG)	Hove (2002), Hove & Haas (2009)
Standard Austrian German (StAG)	Moosmüller et al. (2015)

Table C.32: Other varieties of German

Comments	Source
Variety of High German spoken in Kiel	Glover (2011, 2014)
Unspecified variety of German; data obtained by introspection	Moltmann (1990)
Ethnolects spoken in Berlin	Auer (2002),Wiese (2012), Jannedy & Weirich (2014)

Appendix D: Versions of velar fronting

I list below the triggers and targets for all versions of velar fronting posited in this book for word-initial position and postsonorant position. For several versions of velar fronting in word-initial position the target segment can optionally be preceded by a word-initial sibilant. This requirement is not expressed below in the first table.

Table D.1: Targets and triggers for velar fronting in word-initial position

Rule:	Trigger:	Target:
Wd-In Vel Fr-1	[−low, coronal]	[−son, +cont, dorsal]
Wd-In Vel Fr-2	[+cons, +son, coronal]	[−son, +cont, dorsal]
Wd-In Vel Fr-3	[−cons, coronal]	[−son, +cont, dorsal]
Wd-In Vel Fr-4	[+high, coronal]	[−son, +cont, peripheral]
Wd-In Vel Fr-5	[−low, coronal]	[−son, +cont, peripheral]
Wd-In Vel Fr-6	[−cons, coronal]	[−son, dorsal]
Wd-In Vel Fr-7	[+high, −round, coronal]	[−son, +cont, dorsal]
Wd-In Vel Fr-8	[+son, coronal]	[−son, +cont, dorsal]

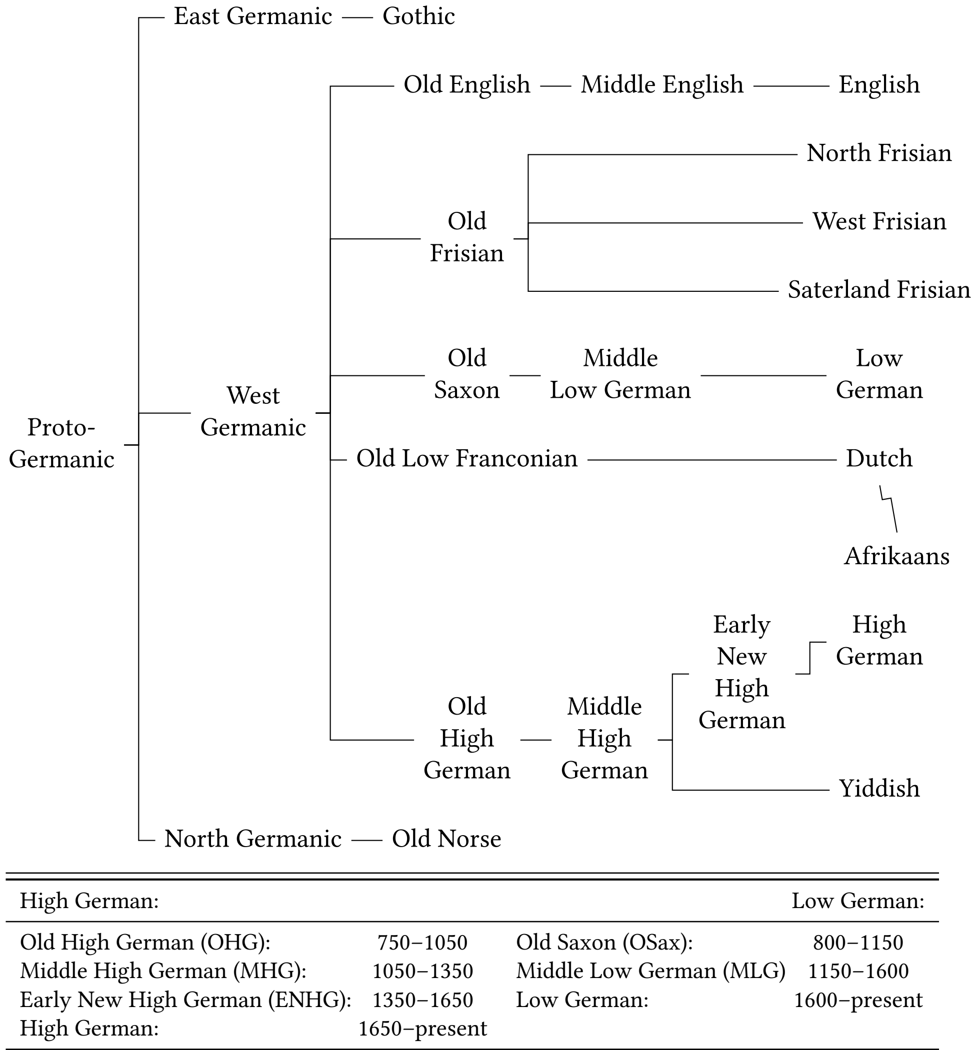
Table D.2: Targets and triggers for velar fronting in postsonorant position

Rule:	Trigger:	Target:
Vel Fr-1	[+son, coronal]	[−son, +cont, dorsal]
Vel Fr-2	[−low, coronal]	[−son, +cont, dorsal]
Vel Fr-3	[+cons, +son, coronal]	[−son, +cont, dorsal]
Vel Fr-4	[+son, coronal]	[−son, +cont, +fortis, dorsal]
Vel Fr-5	[−low, coronal]	[−son, +cont, +fortis, dorsal]
Vel Fr-6	[+high, coronal]	[−son, +cont, peripheral]
Vel Fr-7	[−low, coronal]	[−son, +cont, peripheral]
Vel Fr-8	[−cons, coronal]	[−son, dorsal]
Vel Fr-9	[+son, coronal]	[+cons, dorsal]
Vel Fr-10	[+tense, coronal]	[−son, +cont, dorsal]
Vel Fr-11	[+high, −round, coronal]	[−son, +cont, dorsal]
Vel Fr-12	[−round, coronal]	[−son, +cont, dorsal]
Vel Fr-13	[−cons, coronal]	[−son, +cont, dorsal]
Vel Fr-14	[−cons, −nasal]	[−son, +cont, dorsal]

Appendix E: Family tree for Germanic languages

A number of proposals have been made for the classification of Germanic languages; see Robinson (1992) for some useful discussion and references. There is widespread agreement that the original language (Proto-Germanic) had three branches: West Germanic, North Germanic, and East Germanic. Those three groupings are depicted in the family tree below. A number of scholars have proposed that West and North Germanic derived from an earlier Northwest Germanic group. The reader is referred to Fulk (2018: 22ff.) for an assessment of the arguments for the Northwest Germanic grouping and general discussion (including many useful references) of the Germanic language family tree.

The most significant branches for present purposes are the ones culminating in High German (HG) and Low German (LG). The dates for the HG branch given below are in accordance with the ones usually assumed in the scholarly literature; see, for example, Paul (2007: 9–10). The distinction among the early stages of the LG branch is not as clear cut as it is for HG. I adopt henceforth the stages and dates in Foerste (1957). A useful summary of the dates for the HG and LG branches can be found in Schmidt (2007: 16–22).



High German:			Low German:
Old High German (OHG):	750–1050	Old Saxon (OSax):	800–1150
Middle High German (MHG):	1050–1350	Middle Low German (MLG)	1150–1600
Early New High German (ENHG):	1350–1650	Low German:	1600–present
High German:	1650–present		

Figure E.1: Germanic languages

Appendix F: Modern reflexes of historical dorsal sounds

A central goal of the present book is to determine the realization of original (WGmc) velars in modern HG and LG dialects. As a point of reference this appendix shows how historical velars developed into those modern HG dialects on which StG is based (henceforth HG). The sounds discussed below also include the etymological palatal glide; hence the appendix considers the modern reflexes of dorsal sounds.

The changes discussed below have been discussed at length in the earlier literature, e.g. Wright (1907), Prokosch (1938), von Kienle (1969), Russ (1978a, 1982), Szulc (2002), and Fulk (2018). Two works discussing the development of original velars into modern German dialects include Behaghel (1911) and especially Schirmunski (1962).

I consider first the development of WGmc dorsal sounds in terms of their probable phonetic realizations based on the conclusions drawn from scholars of Gmc like the ones cited above. At the end of this appendix I show how the phonetic dorsals of WGmc fit into a system of contrastive sounds (phonemes).

WGmc velars surfacing in word-initial position were $^{+}$[k ɣ], as well as the $^{+}$[k] in $^{+}$[sk] clusters. PGmc $^{+}$[x] did not occur in word-initial position in WGmc because it either debuccalized to [h] before a vowel in (1a) or deleted before a consonant in (1b). Phonetic representations for the words listed in (1) and below can be inferred from the StG orthography.

(1) a. PGmc $^{+}$[x] > HG [h] Heer ‘army’, Herz ‘heart’
    b. PGmc $^{+}$[x] > HG ∅ lachen ‘laugh-INF’ (cf. Go *hlahjan*), rein ‘pure’ (cf Go *hrains*)

All instances of word-initial [x]/[ç] in HG are loanwords (Appendix G). The reason why no native word begins with [x]/[ç] is that the earlier reflex of those sounds (PGmc $^{+}$[x]) either underwent h-Deletion or Debuccalization. Since there were no independent (German-specific) changes that introduced new instances of word-initial [x]/[ç] in HG, there are no native words beginning with those sounds.

The modern reflex of WGmc $^+$[k] in word-initial position is [k] in (2a), while WGmc $^+$[sk] is now realized as [ʃ] in (2b). WGmc $^+$[ɣ] in word-initial position is [g] in (2c).

(2) a. WGmc $^+$[k] > HG [k] Kuh ‘cow’, Kind ‘child’
  b. WGmc $^+$[sk] > HG [ʃ] Schaf ‘sheep’, schöpfen ‘ladle-INF’, schlafen ‘sleep-INF’
  c. WGmc $^+$[ɣ] > HG [g] Gast ‘guest’, gelb ‘yellow’, Glas ‘glass’

The traditional phonetic symbol for WGmc $^+$[ɣ] is ”g”, although most scholars confusingly consider that word-initial sound to be a lenis fricative ([ɣ]) and not the corresponding stop ([g]). The reason the velar in question was realized as a fricative word-initially is that this is how it was realized in most of the earliest attested WGmc languages, i.e. OE, OLF; see Moulton (1972: 173) and Ringe (2006) for a similar conclusion concerning PGmc. The same generalization must also be true for the earliest stages of LG because an initial dorsal fricative (from WGmc $^+$[ɣ]) is the norm in LG (Wph) dialects described at the end of the nineteenth and early twentieth centuries (Chapter 4). It is therefore assumed throughout the present book that the initial sound in words like the ones in (2c) was a phonetic fricative (WGmc $^+$[ɣ]), which shifted to [g] in an early stage (OHG).

The developments in (1) and (2) are depicted in (3):

(3) Modern reflexes of historical velar obstruents in word-initial position:

$^+$[x]	$^+$[k]	$^+$[sk]	$^+$[ɣ]	PGmc
|	|	|	|	
$^+$[h]	$^+$[k]	$^+$[sk]	$^+$[ɣ]	WGmc
|	|	|	|	
[h]	[k]	[ʃ]	[g]	HG

WGmc velars surfacing after a sonorant were $^+$[k x ɣ], as in (4):

(4) a. WGmc $^+$[x] > HG [x]/[ç] Furche ‘furrow’, Nacht ‘night’, fechten ‘fence-INF’
  b. WGmc $^+$[k] > HG [x]/[ç] Dach ‘roof’, Reich ‘empire’
  c. WGmc $^+$[ɣ] > HG [g] Wagen ‘car’, liegen ‘lie-INF’, folgen ‘follow-INF’
  d. WGmc $^+$[ɣ] > HG [ç] König ‘king’

The original fortis fricative is retained as a fricative, which undergoes velar fronting in the context of front sounds in (4a). WGmc ⁺[k] is realized as a velar fricative in postsonorant position in (4b) by the High German Consonant Shift (Braune 2004). The new velar fricative created by the latter change undergoes velar fronting in the context after front segments. Since the High German Consonant Shift did not affect LG, the LG reflex of WGmc ⁺[k] is [k]. As a consequence, there are significantly more words containing [x]/[ç] in HG than in LG. In the default case, WGmc ⁺[ɣ] is realized in HG as [g] in (4c), but in the context after [ɪ] in coda position, it is realized as [ç] in (4d).

Comparative evidence from the earliest attested WGmc languages supports treating the original velar in (4c, 4d) as a fricative (⁺[ɣ]) and not as a stop, but the same conclusion can be drawn from HG and LG dialect data. As attested in a number of varieties discussed in this book, the original WGmc sound in (4c, 4d) is retained as a velar/palatal fricative after any vowel; hence, the [g] in the HG words in (4c) is realized as [ɣ]/[ʝ]. The same generalization holds in final position, e.g. words like *Tag* 'day' and *Sieg* 'victory' where the final sound is [k] in HG is [x]/[ç] in many HG and LG varieties.

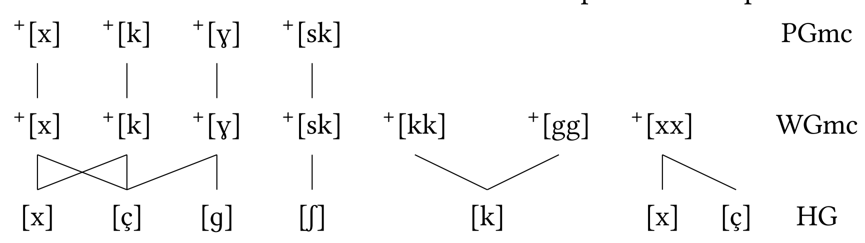
Historical geminate velar stops underwent Degemination in (5a, 5b). In (5c) it can be seen that WGmc ⁺[xx] degeminated and now surfaces as velar or palatal depending on the nature of the preceding sound.

(5) a. WGmc ⁺[kk] > HG [k] Rock 'skirt', recken 'stretch-INF'
    b. WGmc ⁺[gg] > HG [k] Brücke 'bridge', Mücke 'mosquito'
    c. WGmc ⁺[xx] > HG [x]/[ç] lachen 'laugh-INF', Küche 'kitchen'

The WGmc geminates in (5) were typically derived from the corresponding singletons before [j] by WGmc Gemination (Simmler 1974, Murray & Vennemann 1983, Murray 1986, Ham 1998, Denton 1998, Fulk 2018). Others emerged after a short vowel from the High German Consonant Shift.

The developments in (4)–(5) are illustrated in (6). Not depicted here is the velar nasal (HG [ŋ]), which only surfaced in early Gmc in nasal-stop clusters, e.g. ⁺[ŋk] and ⁺[ŋk].

(6) Modern reflexes of historical velar obstruents in postsonorant position:



The WGmc palatal glide – referred to throughout this work as the etymological palatal – is retained as a palatal in word-initial position in HG; see (7a). In some modern varieties the original word-initial palatal glide is retained as a glide (e.g. in Almc; see Chapter 3); however, in many other varieties the original glide is now realized as a palatal fricative, e.g. Chapter 4 for LG, Chapter 9 for HG (CG). These two realizations of the original glide are depicted in (8). In some LG varieties (Chapter 10) WGmc $^+$[j] in examples like the ones in (7a) is now realized as a sibilant fricative ([ʒ]). In contexts other than word-initial position, the original palatal glide deletes, as in (7b).

(7) a. WGmc $^+$[j] > HG [j]/[ʝ] ja 'yes', Jugend 'youth'
b. WGmc $^+$[j] > HG ∅ recken 'stretch-INF', bitten 'ask-INF'

(8) Modern reflexes of the palatal glide:

$^+$[j] WGmc

[j] [ʝ] HG

Among the WGmc velar sounds discussed above there is agreement among scholars that $^+$[k] was phonemic (/k/) because it contrasted with other consonants (e.g. /p/, /b/, /t/, /d/). $^+$[h] and $^+$[x] stood in complementary distribution, where the former surfaced only word-initially and the latter elsewhere. I capture that distribution with the WGmc phoneme /x/, which was realized as $^+$[h] in word-initial position by the synchronic reflex of the historical change referred to above (Debuccalization). Note that the allophonic distribution of $^+$[h] and $^+$[x] is inherited into many modern varieties of HG, e.g. Maienfeld (§3.3). The velar nasal was an allophone of /n/, since $^+$[ŋ] only occurred before a homorganic stop ($^+$[ŋk] and $^+$[ŋg]) and $^+$[n] elsewhere (see Moulton 1972: 171 for PGmc). Thus, the WGmc phoneme was /n/, which was realized as $^+$[ŋ] before a velar sound by Regressive Nasal Place Assimilation. (The WGmc phoneme /m/ contrasted with /n/ initially, medially, and finally). The two lenis velars $^+$[ɣ] and $^+$[g] are considered by most scholars to be allophones of a single phoneme. In early Gmc (e.g. OE, OLF) the fricative had a much wider distribution than the stop: [g] surfaced only after $^+$[ŋ] and in gemination ($^+$[gg]) and [ɣ] in the elsewhere case (initially, medially between a vowel or liquid and a vowel, and finally after a vowel or liquid); see Moulton (1972: 173) and Szulc (2002: 113–114) on PGmc. It is not always clear from the scholarly literature how the synchronic relationship between $^+$[ɣ] and $^+$[g] should be expressed. Here are two options: (a) There was a WGmc phoneme /g/

that was realized as ⁺[ɣ] in the contexts listed above, or (b) there was a WGmc phoneme /ɣ/ that was pronounced ⁺[g] after a homorganic nasal and in gemination. For purposes of this book I adopt (b) and not (a) because of the wider distribution of WGmc ⁺[ɣ]. As a consequence I posit that there was a change I call g-Formation (e.g. Chapter 3 and elsewhere), which shifted that original fricative /ɣ/ to the stop [g]. Finally, the etymological palatal (WGmc ⁺[j]) is a phonemic (underlying) glide (/j/). No scholarly works to my knowledge have actually argued that /j/ is phonemic (as opposed to being synchronically derived from another sound, presumably /i/), but the basic line of argumentation discussed in Hall (2017) for the glides of MHG can be extended to WGmc as well.

Appendix G: The status of [x] and [ç] in loanwords

Dorsal fricatives in nonnative words occur either word-initially or after a sonorant. The purpose of this appendix is to introduce some of the data and to provide brief remarks on the difficulties they pose for a potential analysis.

G.1 Word-initial position

There are no native words of StG beginning with [x] or [ç]; the historical reasons for that gap are discussed in Appendix F. Word-initial [x] or [ç] discussed in the literature referred to in §1.1 therefore all involve loanwords like the ones in (1). Representative examples of words with [ç] are listed in (1a) and ones with [x] in (1b). The pronunciation in the first column is the one found in Mangold (2005).

(1)	a.	[çemiː]	Chemie	'chemistry'
		[çiːnɑ]	China	'China'
		[çɑrɪsmɑ]	Charisma	'charisma'
		[çolɛsteriːn]	Cholesterin	'cholesterol'
	b.	[xɔtɛk]	Chotek	'Chotek'
		[xɛp]	Cheb	'Cheb'
		[xʊntɑ]	Junta	'junta'

According to one school of thought, words like the ones in (1a) are integrated (assimilated) loanwords, while the ones in (1b) are non-integrated (unassimilated). That approach therefore sees the palatal [ç] as the only acceptable pronunciation in word-initial position, while initial [x] can be ignored because it lies on the extreme periphery of the German lexicon. Some of the authors who accept a variant of that view include Wurzel (1980: 956), Hall (1989: 3), Wiese (1996b: 210), and Noske (1997: 232, Footnote 3), although other names could be added to that list as well.

The theoretical literature cited above almost invariably treats loanwords like the ones in (1a) on par with native words. In §1.2 I describe briefly one such

approach to StG dorsal fricatives, according to which the data in (1a) are crucial in determining whether or not the underlying dorsal fricative in postsonorant position in fully native words is /x/ or /ç/. The argument is that by including the data in (1a), [ç] occurs in a wider set of contexts than [x], since the former occurs after front vowels, after sonorant consonants, or word-initially, while the latter surfaces only after back vowels. The implication is that surface [x] should be derived from the segment with the wider distribution, namely /ç/. Given that approach, velar fronting regularly creates [x] from /ç/ after a back vowel, and in word-initial position /ç/ surfaces without change as [ç]. On this approach the surface [x] in (1b) is ignored because it is present in unassimilated words.

Robinson (2001) criticizes the approach described above – correctly in my view – on the grounds that the decision to classify a loanword as integrated or non-integrated is arbitrary. He writes (p. 58): "…it cannot honestly be said that any of the analyses I have looked at [regarding data like the ones in (1), T.A.H.] give any independent criteria for what constitutes a fully integrated loanword in German (that is, one which in the relevant respects adheres to German phonological patterns)".

The nature of the word-initial fricative in (1) can vary depending on the dialect/speaker. For example, many speakers substitute the [ç] in (1a) with either [ʃ] or [k]. Noske (1997: 222) gives the examples in (2), which can be taken to be representative for some speakers. It needs to be stressed that speakers with the [ʃ] or [k] pronunciation in (2) will have [x] and [ç] as predictable positional variants in postsonorant position; hence, the examples with [ʃ] or [k] in (2) cannot be interpreted as an across-the-board avoidance of dorsal fricatives.

(2)	[çiːʀʊɐk], [kiːʀʊɐk], [ʃiːʀʊɐk]	Chirurg	'surgeon'
	[çemiː], [kemiː], [ʃemiː]	Chemie	'chemistry'
	[çiːnɑ], [kiːnɑ], [ʃiːnɑ]	China	'China'
	[çɑʀɪsmɑ], [kɑʀɪsmɑ], [ʃɑʀɪsmɑ]	Charisma	'charisma'
	[çoːlɛsteʀiːn], [koːlɛsteʀiːn], [ʃoːlɛsteʀiːn]	Cholesterin	'cholesterol'

The three pronunciations in (2) are sometimes interpreted as belonging to different dialects. For example, according to Pilch (1966: 254), the pronunciation with [ç] is preferred for northeast German speakers ("Nordostdeutsche"), while speakers in the northwest prefer [ʃ] and speakers in the south [k]. Recall from §17.2 that [k] is typical for StAG.

Many speakers have yet another realization of word-initial dorsal fricatives like the ones in (1). Consider first the variety of German spoken in the city of Kiel (Map 4.1) described by Glover (2014). As indicated in (3), Glover's speakers

have a very different pattern than the one in StG (1). In particular, Kiel has no word-initial [x]; hence, the StG examples in (1b) are realized with the stop [k] or the glide [j]; see (3b, 3c). It needs to be stressed that the pronunciation in (3c) holds for speakers with no knowledge of Spanish. Significantly, the only word-initial dorsal fricative acceptable to Glover's speakers is [ç], but only before a front vowel; see (3a).

(3)	a.	[çemiː]	Chemie	'chemistry'
		[çiʀʊɐk]	Chirurg	'surgeon'
	b.	[kɑːʀɪsmɑ]	Charisma	'charisma'
		[kolɛsteʀiːn]	Cholesterin	'cholesterol'
	c.	[jʊntɑ]	Junta	'junta'

From a formal point of view, the word-initial [ç] can be analyzed as a word-initial allophone of /x/; the [k] in (3b) derives synchronically from /k/ and the glide in [j] from the corresponding vowel (/i/), although the treatment of glides is peripheral to the analysis of dorsal fricatives.[1]

According to Hove & Haas (2009), the distribution of postsonorant [x] and [ç] in StSwG is as in StG: [x] after a back vowel and [ç] after coronal sonorants. In word-initial position, [ç] occurs before a front vowel in (4a), but before a back vowel in (4b) or consonant in (4c), either [x] or [k] occurs. Thus, word-initial /x/ in StSwG shows a fronting to palatal [ç] in (4a) by a version of velar fronting. (The variant pronunciation with [k] derives synchronically from /k/).

(4)	a.	[çemiː]	Chemie	'chemistry'
		[çiʁʊʁgiː]	Chirurgie	'surgery'
	b.	[xaːɔs], [kaːɔs]	Chaos	'chaos'
		[xaʁaktəʁ], [xaʁaktəʁ]	Charakter	'character'
	c.	[xʁoːm], [kʁoːm]	Chrom	'cholesterol'

A similar generalization concerning word-initial dorsal fricatives holds for the data discussed in Jessen (1988), although he accepts both [x] and [ç] in word-initial position in his speech. Jessen argues that the two sounds stand in an

[1]Impressionistically, I can confirm the data in (3a, 3b) on the basis of numerous discussions with native speakers through the years. I recall many speakers who express extreme aversion to pronouncing [ç] in word-initial position before a back vowel (e.g. in the final two words in 1a). Those speakers invariably pronounce those words with [k]. My view on the initial sound in (3b) is shared by Rapp (1841: 32), who opines that a [ç] in word-initial position before a back vowel – his examples are *Chaos, Character, Cholera* – would sound "abominable" ("abscheulich").

allophonic relationship in word-initial position, where the choice between the two is determined by the following vowel: [ç] before a front vowel, as in (2a) and [x] before a back vowel, as in (2b). The rule he posits relating [x] and [ç] is bidirectional and therefore applies postvocalically in words like *mich* [mɪç] 'me-ACC' and *Krach* [kʀɑx] 'noise' and progressively in word-initial position, as in (2). Word-initial [ç] before a back vowel in words like *Charon* [çɑːʀɔn] 'Greek mythological figure' and *Chauke* [çɑukə] 'Germanic tribe' (cf. Latin *Chauci*) are treated as exceptions (Jessen 1988: 391).

Although there is disagreement in the literature concerning the status of words like the ones in (1b) vs. (1b), there is a general consensus that the examples cited in the pronouncing dictionaries in which a dorsal fricative appears in word-initial position before a consonant are truly unacceptable. This generalization is true for both [ç], as in (5a) and [x], as in (5b). The examples in (5) were drawn from Mangold (2005). However, recall from (4c) that some speakers of StSwG have [x] in that context.

(5)	a.	chtonisch	[çtoːnɪʃ]	'underground'
		chrysander	[çʀyzandɐ]	'(name)'
	b.	Chmel	[xmɛl]	'(name)'
		Chrobak	[xʀoːbak]	'(name)'

See Robinson (2001: 60), who remarks in a footnote that he omits from his discussion the pronunciations of word-initial *ch* before a consonant because they have typically not played a role in the analysis of word-initial [x] and [ç].

The observation made in the works cited above is that the status of word-initial dorsal fricatives in loanwords depends to a large extent on geography. This is precisely the conclusion drawn by AADG and WDU, which provide maps illustrating the pronunciation of word-initial *ch* in several of the words listed above. For example, according to AADG, the initial sound in the word *Charisma* is realized as [kʰ] throughout almost all of Germany and Austria and as [x] throughout most of Switzerland. Of the six hundred sixty-nine speakers involved in the survey, only two had the [ç] realization prescribed in the pronouncing dictionaries. WDU Map 112 in Volume 2 likewise depicts the areal distribution of the initial sound in the word *China*.

G.2 Postsonorant position

Four representative examples of loanwords containing postsonorant dorsal fricatives are presented in (6). The pronunciation indicated here is the one for StG

(Mangold 2005). These examples show the same pattern described earlier for dorsal fricatives in native words: [x] surfaces after a back vowel in (6a) and [ç] after a front vowel in (6b) or sonorant consonant in (6c). Since I make some reference below to stress I include the diacritic in (6) and below.

(6)	a.	[mɑzoˈxɪsmʊs]	Masochismus	‘masochism’
	b.	[ˈɛço]	Echo	‘echo’
	c.	[kolˈçoːzə]	Kolchose	‘kolkhoz’
		[tutɑnˈçɑːmon]	Tutanchamon	‘Tutanchamon’

In a very small number of works discussed below the observation has been made that some speakers have an alternate pronunciation for the item listed in (6a). That example and a few other words are presented in (7). Note that palatal [ç] occurs in some items after a back vowel.

(7)	a.	[mɑzoːˈçɪsmʊs]	Masochismus	‘masochism’
		[ˈmɑzoːx]	Masoch	‘Masoch’
	b.	[ɔynuːˈçɪsmʊs]	Eunuchismus	‘eunuchism’
		[ɔyˈnuːx]	Eunuch	‘eunuch’
	c.	[hypoːˈçɔndɐ]	Hypochonder	‘hypochondriac’

The data in (7) are drawn from the first publication to my knowledge in which the alternate pronunciation for words like the one in (6a) is discussed, namely Kenstowicz (1994: 308). That author attributes the examples in (7) to an unpublished manuscript (Moltmann 1990). Kenstowicz has an exercise involving the distribution of German [x] and [ç] which includes not only some of the familiar examples involving [x] and [ç] in native words but also the words in (7). Note that the items in (7a) and (7b) show an alternation between [x] and [ç].[2] A more recent treatment of examples like the ones in (7) is Taylor (2010).

One of the reasons why the alternate pronunciation (e.g. [mɑzoˈçɪsmʊs] in 7a vs. [mɑzoˈxɪsmʊs] in 6a) is difficult to assess is that it is not clear what the data are one is supposed to be analyzing. The problem is that neither Kenstowicz nor the final source I discuss below provides a complete set of data. Some of the factors any analysis needs to consider are: (a) stress, (b) the nature of the vowel following the dorsal fricative, (c) the nature of the vowel preceding the dorsal fricative, and (d) syllabification.

[2]Kenstowicz has incomplete transcriptions which only include the vowel plus dorsal fricative sequence (i.e. “[oːx]” for the first example in 7a and “[uːç]” for the first example in 7b). No transcription is provided for the item in (7c), other than [ç].

On the basis of the words in (7), one might hypothesize that the dorsal fricative is realized as [ç] before a stressed syllable. Since feet in German are trochaic (Féry 1998), one could argue that speakers with the pronunciation in (7) have a rule deriving [ç] from /x/ in foot-initial position. The prediction would therefore be that /x/ surfaces as [x] after a back vowel if the fricative is not foot-initial, as in (6b). The problem is that Kenstowicz does not include that type of example in his exercise; hence, one cannot know if the analysis is correct.

A second published treatment of the [mɑzoːˈçɪsmʊs]-type data in (7) is Merchant (1996: 711). He lists – in addition to the familiar examples involving [x] and [ç] in native words – the six words in (8). The phonetic transcriptions are the ones given in that source; I include the diacritic for stress for reference. Merchant includes neither the item in (7c) nor the ones in (6b, 6c).

(8)	a.	[mɑzoːˈ.çɪst]	Masochist	'masochist'
		[ˈmɑzoːx]	Masoch	'Masoch'
	b.	[oɪnuːˈçɪsmus]	Eunuchismus	'eunuchism'
		[ɔyˈnuːx]	Eunuch	'eunuch'
		[ɔynuːçɪˈziːrən]	eunuchisieren	'make-PL into a eunuch'
	c.	[paroːˈçiː]	Parochie	'parish'

The third item in (8b) is the only one that speaks against the foot-based analysis referred to above. Merchant argues that the dorsal fricative is realized as [ç] in syllable-initial position. Thus, a word like the first one in (8a) is parsed [mɑ.zoː.çɪst]. By contrast, the realization of the dorsal fricative is [x] after a back vowel and before a vowel if that dorsal fricative is ambisyllabic, e.g. the [x] in a (native) word like *rauchen* [raʊxən] 'smoke-INF'.

A drawback with the analysis of Merchant is that it relies on analyzing certain intervocalic consonants as ambisyllabic (e.g. the [x] in [raʊxən] 'smoke-INF') for which there is no independent evidence at all. To be clear: It has been proposed in the literature on StG that certain intervocalic consonants are ambisyllabic, but those studies agree that ambisyllabic consonants are situated between a short vowel and another vowel (Wiese 1996b). The analysis of the [x] in a word like [raʊxən] 'smoke-INF' as ambisyllabic therefore derives no independent support. The reader is also referred to studies arguing against ambisyllabic consonants in German (Jensen 2000).

Appendix H: Inventories of nonsyllabic sounds

The system of phonemic (contrastive) nonsyllabic sounds (consonants and glides) in the broad dialect groupings from Appendix A (UG, CG, LG) are discussed below. Those three groupings are indicated on Map A.1. Some discussion of consonants (and vowels) in more specific regional varieties of German can be found in Keller (1961) and Russ (1989). Two important sources for LG are Sarauw (1921) and Foerste (1957).

In Table H.1 I list the underlying (phonemic) nonsyllabic segments in typical UG dialects investigated in this book. Stops (but not affricates or fricatives) show a two-way laryngeal contrast (i.e. fortis /t/ vs. lenis /d/). The affricate /kx/ is enclosed in parentheses because it is restricted to certain Almc varieties of SwG and to Tyr varieties of SBav. The one rhotic phoneme can be either coronal (/r/) or dorsal (/ʀ/), depending on dialect.[1]

Table H.1: UG nonsyllabic segments

stops	p b	t d			k g	
affricates	pf	ts	tʃ		(kx)	
fricatives	f	s	ʃ		x	h
nasals	m	n			ŋ	
liquids		l, r				
glides	w			j		

[1] I omit from consideration those segments that only occur in nonnative words, namely the lenis postalveolar fricative /ʒ/ and the lenis postalveolar affricate /dʒ/. The original sources cited in the present book often provide very detailed phonetic descriptions for the consonants and vowels in the respective dialects. Some of those descriptions refer to sounds not discussed in this appendix, but on closer inspection many of those segments can be analyzed as allophones of one of the sounds present in Tables H.1–H.3. In an effort to maintain a clear focus I try not to burden the reader with unnecessary commentaries regarding sounds that might not be relevant for my analysis of velar fronting.

The palatal fricative [ç] is present in most UG dialects investigated in this book, although that sound is derived synchronically from /x/. Rare varieties of LAlmc treat [ç] as a phoneme (/ç/); see §14.3.2. The initial sound in StG words like *ja* 'yes' behaves phonologically in UG as a glide ([j]) and not as a fricative ([ʝ]). The glide /w/ (=/v/ in StG words like [vɑs] 'what' and [tsvɑi] 'two') is referred to in some dialect descriptions as a (lenis) bilabial fricative (=IPA [β]).

In Table H.2 and Table H.3 I present a list of the contrastive nonsyllabic segments in the CG/LG dialects under investigation. A two-way laryngeal contrast characterizes most of the stops (e.g. fortis /t/ vs. lenis /d/) and most of the fricatives (e.g. fortis /s/ vs. lenis /z/). Affricates are absent from LG. In CG only /pf/ and /ts/ – but never /kx/ – are present. As in Table H.1, the one rhotic consonant in Tables H.2 and H.3 is either as coronal (/r/), or dorsal (/ʀ/) depending on the dialect. The postalveolar fricative /ʃ/ is absent in many conservative varieties of WLG which preserve WGmc ⁺[s] as [s] (/s/) before a consonant (e.g. [s] for [ʃ] in StG *Stadt* [ʃtɑt] 'city', *schreiben* [ʃʀɑibən] 'write-INF') or after a rhotic (e.g. [s] for [ʃ] StG *Kirsche* [kɪʀʃə] 'cherry'). Other varieties of LG have phonemicized [ʃ] (/ʃ/) in those contexts. The sibilant fricative [ʃ] (/ʃ/) in many varieties of CG is realized as alveolopalatal [ɕ]; see Chapter 10.

Table H.2: CG nonsyllabic segments

stops	p b	t d			k (g)	
affricates	pf	ts	tʃ			
fricatives	f v	s z	ʃ	ʝ	x (ɣ)	h
nasals	m	n			ŋ	
liquids		l, r				

Table H.3: LG nonsyllabic segments

stops	p b	t d			k (g)	
fricatives	f v	s z	(ʃ)	ʝ	x (ɣ)	h
nasals	m	n			ŋ	
liquids		l, r				

The two sounds [g] and [ɣ] (as well as [ʝ] and [x ç]) in Tables H.2 and H.3 are related diachronically and synchronically. In many dialects – including StG – there are regular alternations between [g] and [x ç], although other dialects show

alternations between [g] and [ɣ ʝ x ç]. For example, in one commonly attested system, [g] surfaces as [g] word-initially and as [ɣ] or [ʝ] in a word-internal onset depending on whether or not a back vowel or a front vowel precedes. In that type of system, the dorsal fricatives derived from /g/ surface as [x] or [ç] in coda position after a back vowel and front vowel respectively. Thus, there is synchronic rule of g-Spirantization, which itself feeds velar fronting.

A number of writers have observed that the sound transcribed in Tables H.2 and H.3 as [v] is realized as an obstruent ([v]) in syllable-initial position (e.g. [vɑs] 'what') and as a glide-like (approximant) sound in the context after a word-initial consonant; the symbol usually used for that realization is [ʋ]. Thus, the [v] in a StG word like [tsvɑi] 'two' is realized in that type of dialect as [tsʋɑi]; see Wiese (1996b: 235–242). An extensive discussion of similar data from Wph can be found in Hall (2014c).

Appendix I: Velar fronting parallels in a selection of Indo-European languages

The typological literature cited throughout this book stresses that the fronting of velar sounds in the neighborhood of front vocoids like [i] and [j] is a phonetically plausible development that is well-attested in the languages of the world. The purpose of this appendix is to briefly assess the (in)stability of velars in the neighborhood of front vocoids in a small set of Indo-European languages. In particular, I focus on those Gmc languages (WGmc/NGmc) not discussed in this book, as well as the two major language families spoken in the immediate vicinity of German-speaking countries, namely Slavic and Romance. The name for the fronting of velars in the literature cited below differs from author to author; for the sake of consistency, I refer to it as Velar Palatalization, which is also the term typically adopted in the typological literature (§2.3). In the following paragraphs I consider the status of Velar Palatalization from the diachronic perspective, but I also assess its role as a synchronic process in modern languages.

The purpose of this appendix is not to present data illustrating Velar Palatalization in a representative selection of phonological contexts for each language. Instead, I summarize the basic facts as they are presented in the works cited and give a few selected examples for illustration. With the exception of my discussion of North Frisian, I restrict my discussion of the standard languages and make no attempt to assess the status of the palatalization/fronting of velars in regional dialects.

In order to facilitate a comparison between velar fronting in German dialects and Velar Palatalization in the languages spoken (or once spoken) in north-central Europe it is important to consider Velar Palatalization in terms of the same parameters for velar fronting. Those parameters are: (a) the nature of the target velar consonant, (b) the nature of the trigger, (c) the nature of the output, (d) directionality (right-to-left or left-to-right), and (e) the position of the target consonant in the word (word-initial, word-medial, word-final).

I turn now to the individual language families:

I.1 Germanic

The fronting of a velar in the neighborhood of front vocoids is not well-attested as a synchronic rule in modern Gmc languages (Hall 2020), although that type of historical change has occurred. I consider NGmc and WGmc in that order:[1]

I.1.1 North Germanic

In an early stage (ca. thirteenth century) velar stops (/k g/) were fronted before front vocoids (Haugen 1976, 1982). The change was regular in word-initial position, but in word-medial position it was not as widespread. The output sounds of Velar Palatalization when it was phonologized were probably the corresponding palatal stops ([c ɟ]), which were later realized differently depending on the language. In particular, earlier [c ɟ] are retained as palatals in Icelandic ([c^{h} c]), but in Norwegian they are realized as [ç j] and in Swedish as [ɕ j], cf. the initial segment in the verb 'give-INF': Icelandic *gefa* [cɛːva], Norwegian *gi* [jiː], Swedish *ge* [jeː]. The palatal sounds in those cognates derive from velar [g] in ON *gefa*.

In modern Scandinavian languages there are vestiges of the historical process of Velar Palatalization in the form of morphophonemic alternations; see Kristoffersen (2000: 112) for Norwegian, Arnason (2011: 101–103) for Icelandic, and Riad (2014: 109) for Swedish. Although Velar Palatalization was once an allophonic process (e.g. [k] and [c] were positional variants), the modern reflexes of the palatals created by that historical process (or the sounds they later developed into) now contrast with velars; hence, any synchronic process mirroring Velar Palatalization is a rule of neutralization. For example, [k] and [c] contrast in Icelandic, e.g. [cœːr̥] 'done' vs. [kœːrouhtʏr̥] 'impure, feculent'; alternating examples include [k^{h}ɔːma] 'come-INF' vs. [c^{h}ɛːmʏr̥] 'come-3SG'. Recall from §6.5.1 and §7.4.1 that Anderson (1981) and Calabrese (2005) both capture similar velar vs. palatal alternations in Icelandic with synchronic rules mirroring the historical process of Velar Palatalization.

Riad (2014: 108, Footnote 27) observes that Velar Palatalization also affected the historical lenis velar (PGmc $^{+}$[ɣ]) in the context after liquids (/l r/) in Swedish. That change can be observed in Swedish words like [bæːrj] 'mountain', where palatal [j] corresponds to /g/ in StG, cf. the cognate [bɛʀk] /bɛʀg/).

[1] I do not discuss the philological evidence purported to document Velar Palatalization in earlier stages of Gmc (e.g. Van der Hoek 2010 on OHG and OLF) because that evidence is simply too sparse and speculative to draw conclusions concerning the status of the parameters listed above.

I.1.2 West Germanic

I.1.2.1 English

As discussed at length in the scholarly literature, Velar Palatalization regularly applied in the context of front segments in OE; Hogg (2011: 252–270) and Minkova (2014: 84–88) offer two recent treatments of this topic.

Hogg (2011: 252–270) presents a very detailed discussion of Velar Palatalization in OE. Although the generalization is simple – velar consonants are fronted in the context of front segments – there are a number of restrictions regarding the target velar, the front vocoid trigger, and the position of the target and trigger within the word. (Hogg 2011: 253–254 opines that the complex set of conditions can be simplified by taking syllable structure into consideration). The conditions referred to are as follows: In initial position any velar consonant underwent Velar Palatalization before a front vowel, e.g. ⁺*ɣellan* > *yell;* ⁺*kīdan* > *chide.* In word-final position all velar consonants were palatalized after (short or long) /i/, e.g. ⁺*dīk* > *ditch*, but after nonhigh front vowels only velar fricatives served as targets, e.g. ⁺*dæɣ* > *day*. In word-medial position a velar consonant was always palatalized before /i/ or /j/. Velar fricatives underwent the same change in medial position after any front vowel provided that a back vowel did not directly follow, e.g. ⁺*reɣn* > *rain*.

In its earliest stage Velar Palatalization created palatal allophones (e.g. [c ç] from /k x/), but the pronunciation of those palatal sounds was modified by later changes. For example, palatal stops like [c] is now realized as the postalveolar affricate ([tʃ]), as indicated in the modern English examples listed above.

Modern English has many alternations involving a velar stop ([k g]) and a coronal fricative or affricate ([s ʃ dʒ]), e.g. *electri[k]~electri[s]ity, logi[k]~logi[ʃ]ian, analo[g]ous~analo[dʒ]y*. Those alternating forms have been argued to involve the fronting an underlying velar (/k g/) in the context of a following front vocoid by rules of Velar Softening and Palatalization (Chomsky & Halle 1968, Borowsky 1990, Halle 2005).

I.1.2.2 Frisian

WGmc ⁺/k/ and ⁺/ɣ/ underwent Velar Palatalization in initial position before front segments in OFr (Laker 2007, Bremmer 2009). According to the latter author (Bremmer 2009: 30–31), /k/ was realized as the affricate [ts] and /ɣ/ as a continuant.[2] Examples include ⁺*kerka-* > *tserl* 'man' (cf. StG [kɛʀl] 'fellow') and

[2]Bremmer's symbol for [ɣ] is ⟦g⟧, and his symbol for the corresponding continuant is ⟦j⟧, the latter of which was realized orthographically in OFr as *i*. I interpret Bremmer's ⟦j⟧ as the corre-

$^{+}$*gelda-* > *ield* 'money' (cf. StG [gɛlt]). In word-medial position, $^{+}$/k/ likewise underwent the same changes to [ts] before $^{+}$/i/ or $^{+}$/j/, e.g. $^{+}$*dīkjan* > *dītsa* 'build-INF dike-PL' (cf. English *dike*). In medial position the geminate stop $^{+}$/gg/ and the nasal-stop cluster $^{+}$/ng/ ($^{+}$[ŋg]) fronted before $^{+}$/i/ or $^{+}$/j/. $^{+}$/gg/ was realized as the lenis affricate [dz], $^{+}$*saggjan-* > *sedza* 'say-INF' (cf. StG [zɑːgən]), and $^{+}$/ng/ ($^{+}$[ŋg]) as [ndz], e.g. $^{+}$*langi-* > *lendze* 'length' (cf. StG [lɛŋə]). In final position, $^{+}$/ɣ/ was realized as [ʝ] in the context after /e/, e.g. $^{+}$*wega-* > *wei* 'way' (cf. StG [veːk] /veːg/). Additional complications include the etymological source of the palatalization triggers and the retention of $^{+}$/k/ in $^{+}$/sk/ clusters.

Modern Frisian consists of three separate branches (Walker 1989): West Frisian (spoken in the Dutch province of Friesland), North Frisian (spoken in the county of Nordfriesland in the German state of Schleswig-Holstein), and Saterland Frisian (spoken in the district of Cloppenburg in the German state of Lower Saxony). The location of all three Frisian languages is indicated on Map A.1. Given that North Frisian and Saterland Frisian are coterritorial with a velar fronting language (LG), one might suspect that those Frisian languages also have some version of velar fronting.[3] This appears to be the case for North Frisian, although some sources simply make passing reference to velar fronting without providing the necessary details. For example, Bauer (1925: 25) writes that the Moringer dialect has the (fortis) velar and palatal fricatives and that those sounds have a distribution as in StG. Brandt (1913: 43) makes a similar statement for the Goeharden dialect. Jensen (1925: 44–45) likewise asserts that the velar and palatal fricatives in Wiedingharde are distributed according to the frontness of the preceding vowel. Unfortunately, Bauer, Brandt, and Jensen transcribe velars and palatals with the same phonetic symbol; hence, it is not possible to determine the parameters for velar fronting in the dialects they describe. Tedsen (1906: 20) observes that the North Frisian dialect spoken on the island of Föhr has a fortis palatal and a fortis velar fricative which are transcribed with two distinct symbols, i.e. ⟦χ⟧ (=[ç]) and ⟦x⟧ (=[x]). The dialect also has the lenis velar fricative [ɣ] (=⟦ʒ⟧), which can occur after any type of vowel. On the basis of the data from Tedsen (1906) it can be concluded that velar fronting only affects the fortis fricative /x/, which has the allophone [ç] after high front vowels ([i y]) and [x] after back vowels, e.g. ⟦giχl̥⟧ 'violin' (cf. StG *Geige*), ⟦ryχ⟧ 'rough' (cf. StG *rauh*) vs. ⟦lɑxt⟧ 'easy' (cf. StG *leicht*). Since no examples were found in that source for either [ç] or [x] in the context after nonhigh front vowels or consonants it is not possible

sponding palatal fricative /ʝ/ [ʝ]. Bremmer assumes that the change from $^{+}$/k/ to [ts] included more than one intermediate stage, namely $^{+}$/k/ > /kʲ/ > /tʲ/ > /ts/.

[3]West Frisian velars (e.g. [x]) are stable in the context before or after front vowels (Sipma 1913, Cohen et al. 1959, Hoekstra 2001).

to know for sure whether or not the set of triggers consists only of high front vowels. Siebs (1909: 176) states that the North Frisian variety of Helgoland has an ich-Laut and an ach-Laut. Since the dictionary in that work gives lexical entries phonetically with separate symbols for velars and palatals it is easy to see that [ç] surfaces after any front vowel and [x] after any back vowel. (No examples were found in Siebs 1909 for the context after a consonant).

According to Sjölin (1969: 67), Fort (1980: 65), and Fort (2001: 412) Saterland Frisian has both [x] and [ɣ], but there are no corresponding palatals. In his phonetic study of Saterland Frisian, Peters (2017) writes that /x/ is usually realized as a velar fricative, but that some speakers have a palatal variant after front vowels.

I.1.2.3 Afrikaans

According to Combrink & de Stadler (1987: 80), the velar stop /k/ (= orthographic *k*) and the velar fricative /x/ (= orthographic *g*) surface as the corresponding palatals ([c] and [ç]) in word-initial position before a front vowel, e.g. the initial segment in *gieter* 'watering' (cf. StG [giːsən] 'water-INF') and *geld* 'money' (cf. StG [gɛlt] 'money') is [ç], and the *k* in *kies* 'choose-INF' (cf. StG [kiːzə] 'choose-INF') is [c]. The rule of Velar Palatalization ("Palatalisasie") posited by Combrink & de Stadler (1987: 80) is triggered by a front vowel but not by a consonant. Since [ç] and [c] are not contrastive sounds of Afrikaans, Velar Palatalization is an allophonic process. The generalizations concerning the distribution of the velars [k x] and the corresponding palatals are also clear from earlier sources for Afrikaans (Wilson 1964, De Villiers 1969).[4]

I.2 Slavic

Velar Palatalization occurred more than once in the history of Slavic (Carlton 1990). Those changes are usually referred to in the literature as First Velar Palatalization and Second Velar Palatalization. Both had in common that they affected velar stops and fricatives in the context of a following front vocoid, but – as shown below – they created a different set of outputs. Those historical changes

[4] Data and references for word-initial velar fronting in Afrikanns can be found under "Palatalisation" in the online grammar of Afrikaans in Taalportaal (https://taalportaal.org). According to that source, word-initial velar fronting is only triggered by a "high vowel, (especially the high front [i] vowel)". Taalportaal also notes that /ɦ/ undergoes fronting to [ʝ] before a high front vowel, e.g. [ʝiərs] (/ɦers/) 'reign-INF'.

have left their trace in modern Slavic languages in the form of alternations involving velars and coronals (see Rubach 2011 for a survey). For example, the targets for the First Velar Palatalization in Kashubian (West Slavic, Map A.1) are /k g x/, the outputs are [tʃʲ dʒʲ ʃʲ], and the triggers are front vowels (/i ɛ/) which follow the targets, cf. *kale[k]-a* 'invalid' vs. *kale[tʃʲ]-i* 'invalid-NOM.PL', *dro[g]-a* 'road' vs. *dro[dʒʲ]-i* 'road-NOM.PL', *mu[x]-a* 'fly' vs. *mu[ʃʲ]-i* 'fly-NOM.PL'. By contrast, the Second Velar Palatalization creates dental sibilants, but the context is morphologically conditioned. For example, in Ukrainian (East Slavic) the targets are /k ɣ x/, which surface as [tsʲ zʲ sʲ] before an /i/, but only in the dative or locative singular, e.g. *ru[k]-a* 'hand' vs. *ru[tsʲ]-i* 'hand-DAT/LOC.SG', *mu[x]-a* 'fly' vs. *mu[sʲ]-i* 'fly-DAT/LOC.SG'.

I.3 Romance

The palatalization of velars was an important sound change that applied more than once in the history of Romance languages (Buckley 2009 and references cited therein). The First Palatalization occurred in Proto-Romance (third century), at which point /k/ and /g/ served as targets in the context before front vowels (/i e ɛ/). The eventual outputs in Old French for those two target segments were the coronal affricates [ts dʒ], which later shifted to [s z] in modern French. For example, the [ts] and [dʒ] in Old French /tsɛnt/ 'hundred' and /ardʒɛnt/ 'silver, money' were originally [k] and [g], but they are now realized as [s] and [ʒ], i.e. French [sã], [aʀʒã]. The Second Palatalization occurred in Gallo-Romance, two centuries after the First Palatalization. The velar target sounds for the Second Palatalization were /k g/, which became /tʃ dʒ/ in Old French. Since the First Palatalization had eliminated most sequences of /k g/ plus front vowel there were very few native words with those sequences when the Second Palatalization was active; however, some loanwords demonstrate that front vowels served as triggers for the Second Palatalization, and some native items show that the glide /j/ could also induce fronting of a preceding velar, e.g. the initial segment in Old French /tʃjær/ 'dear' was originally /k/. However, the vowel that most commonly served as the trigger for the Second Palatalization is usually transcribed as ⟦a⟧, e.g. Old French /tʃamp/ 'field', /dʒambə/ 'leg', where the initial segments derived historically from /k/ and /g/ respectively. Buckley (2009) argues that ⟦a⟧ represented the low front vowel [æ] when the Second Palatalization was active, in which case the sounds that served as triggers for that change were all and only front vocoids.

Among the modern Romance languages, Italian has been argued to have a synchronic rule of Velar Palatalization which is an outgrowth of the same process

in Latin (Krämer 2009). According to that source, Velar Palatalization is both phonologically and morphologically conditioned. For example, a velar stop (/k/) is realized as [tʃ] in the context before /i/ in noun plurals, e.g. [a'mi:ko] 'friend' ~ [a'mi:tʃi] 'friend-PL' ~ [a'mi:ke] 'friend-FEM.PL'. Velar Palatalization similarly accounts for the alternation between [g] and [dʒ] in second conjugation nouns, but the same process fails to apply in first conjugation nouns.

I.4 Conclusion

It was mentioned above that the historical processes of Velar Palatalization – like the historical process of velar fronting in German – underwent more than one stage. Those stages can be defined according to the nature of the output (e.g. [ki] > [ci] > [tʃi] for English), but they can also be interpreted in terms of the life cycle proposed by Hyman (2013) from §14.6.3. For example, in most of the languages discussed in this appendix Velar Palatalization in its initial stage created fronted allophones (e.g.. [c], [ɟ], [ç], [ʝ]) which later became phonemicized. Depending on the language, the original allophonic process of Velar Palatalization might have later become morphologized (e.g. in Ukrainian) and ultimately lost (in the case of English).

Although there are clear parallels between Velar Palatalization and velar fronting in the languages/language families discussed in this appendix, it is important stress that there are four significant differences:

Targets: The target segments for the languages with Velar Palatalization all include velar stops. By contrast, velar fronting in German dialects always affects at least one velar fricative, but in the unmarked case, velar stops are unaffected. Those German dialects in which velar fronting affects one or more velar stop are not common and are restricted geographically to the areas described in Chapter 11.

Triggers: It has been stressed throughout this book that the triggers for velar fronting in the unmarked HG/LG dialects include not only front vowels but also coronal consonants, i.e. /l r n/. By contrast, the unmarked triggers for Velar Palatalization in the languages discussed above do not include consonants. The one counterexample to this generalization is Swedish, where /l r/ served as triggers for a following velar.

Outputs: If the input segment for Velar Palatalization is a stop, then the output is typically a coronal affricate, e.g. /k/ is realized as [tʃ] (or in some languages

as [ts]). In those marked German dialects in which a velar stop serve as targets for velar fronting, the output is a palatal stop, e.g. /k/ is realized as [c]. By contrast, no variety of German has been found in the present survey which creates an affricate (e.g. [tʃ]) from an underlying stop (e.g. /k/).

Directionality: If Velar Palatalization applies in word-medial position then the trigger is to the right of the target; hence, Velar Palatalization applies regressively (from right-to-left). The two examples discussed above involving left-to-right palatalization (Swedish, OE) also had spreading in the opposite direction. By contrast, in word-medial position velar fronting applies from left-to-right in every dialect of HG and LG without exception.

The conclusion is that velar fronting must be seen as a phenomenon distinct from Velar Palatalization.

Appendix J: List of places in Lower Bavaria (SNiB)

1. Arnbruck
2. Zinzenzell
3. Gossersdorf
4. Moosbach
5. Zell
6. Prackenbach
7. Viechtach
8. Drachselsried
9. Bodenmais
10. Bayer. Eisenstein
11. Scheuereck
12. Wiesenfelden
13. Rattiszell
14. Haibach
15. Klinglbach
16. Kirchaitnach
17. Teisnach
18. Brandten
19. Rabenstein
20. Zwiesel
21. Lindberg
22. Riedenburg
23. Baiersdorf
24. Painten
25. Oberzeitldorn
26. Bärnzell
27. Dachsberg
28. Perasdorf
29. Achslach
30. Zachenberg
31. March
32. Regen
33. Rinchnach
34. Frauenau
35. Finsterau
36. Essing
37. Kelheim
38. Herrnsaal
39. Peising
40. Atting
41. Straubing
42. Parkstetten
43. Bogen
44. Schwarzach
45. Bernried
46. Grafling
47. Bischofsmais
48. Kirchberg im Wald
49. Eppenschlag
50. Spiegelau
51. Neuschönau
52. Mauth
53. Mitterfirmiansreut
54. Philippsreut
55. Eining
56. Pullach

57. Großmuß
58. Schneidhart
59. Wallkofen
60. Perkham
61. Feldkirchen
62. Aiterhofen
63. Irlbach
64. Mariaposching
65. Metten
66. Mietraching
67. Urlading
68. Hunding
69. Innernzell
70. Grafenau
71. Schlag
72. Ringelai
73. Kreuzberg
74. Herzogsreut
75. Haidmühle
76. Mühlhausen
77. Biburg
78. Sallingberg
79. Herrngiersdorf
80. Mallersdorf
81. Laberweinting
82. Hainsbach
83. Oberwalting
84. Oberschneiding
85. Grafling
86. Rottenmann
87. Plattling
88. Seebach
89. Waltersdorf
90. Schöllnach
91. Thurmansbang
92. Lembach
93. Waldenreut
94. Kumreut
95. Karlsbach
96. Grainet
97. Altreichenau
98. Neureichenau
99. Train
100. Obereulenbach
101. Pattendorf
102. Hofendorf
103. Langenhettenbach
104. Asbach
105. Mengkofen
106. Hailing
107. Waibling
108. Haidlfing
109. Oberpöring
110. Aholming
111. Niedermünchsdorf
112. Winzer
113. Außernzell
114. Eging am See
115. Tittling
116. Prag
117. Unterhöhenstetten
118. Heindlschlag
119. Breitenberg
120. Lindkirchen
121. Attenhofen
122. Pfeffenhausen
123. Türkenfeld
124. Oberergoldsbach
125. Martinshaun
126. Unholzing
127. Dornwang
128. Thürnthenning
129. Mamming

130. Landau
131. Exing
132. Hartkirchen
133. Forsthart
134. Künzing
135. Windorf
136. Rathsmannsdorf
137. Ruderting
138. Büchlberg
139. Raßberg
140. Germannsdorf
141. Thalberg
142. Volkenschwand
143. Obersüßbach
144. Weihmichl
145. Oberglaim
146. Essenbach
147. Niederaichbach
148. Weigendorf
149. Frauenbiburg
150. Englmannsberg
151. Haunersdorf
152. Ruppertskirchen
153. Münchsdorf
154. Pörndorf
155. Aldersbach
156. Zeitlarn
157. Sandbach
158. Heining
159. Passau
160. Kellberg
161. Untergriesbach
162. Wegscheid
163. Gründkofen
164. Landshut
165. Jenkofen
166. Kröning
167. Aham
168. Frontenhausen
169. Failnbach
170. Malgersdorf
171. Hainberg
172. Mitterhausen
173. Johanniskirchen
174. Amsham
175. Sachsenham
176. Ortenburg
177. Dorfbach
178. Neukirchen/Inn
179. Haunwang
180. Vilsheim
181. Geisenhausen
182. Seyboldsdorf
183. Schalkham
184. Hölsbrunn
185. Reicheneibach
186. Falkenberg
187. Niedernkirchen
188. Nöham
189. Waldhof
190. Untertattenbach
191. Griesbach im Rottal
192. Hütting
193. Sulzbach
194. Baierbach
195. Haarbach
196. Aich
197. Wolfsegg
198. Huldsessen
199. Hebertsfelden
200. Postmünster
201. Voglarn

202. Asenham
203. Asbach
204. Kühnham
205. Pocking-Hartk.
206. Babing
207. Wurmsham
208. Mitterskirchen
209. Rogglfing
210. Randling
211. Wittibreut
212. Kösslarn
213. Malching
214. Rotthalmünster
215. Aigen
216. Würding
217. Gumpersdorf
218. Eggstetten
219. Stubenberg
220. Ering
221. Kirchdorf am Inn

Appendix K: List of dialect dictionaries

AaWb: *Aachener Sprachschatz. Wörterbuch der Aachener Mundart. Beiträge zur Kultur- und Wirtschafts-Geschichte Aachens und seiner Umgebung*. Hermanns, Will. 1970. Aachen: J.A. Mayer Verlag.

DoWb: *Dortmunder Wörterbuch*. Schleef, Wilhelm. 1967. Cologne: Böhlau Verlag.

DrWb: *Mundart im Heinsberger Land. Dremmener Wörterbuch*. Gillessen, Leo. 1999. Cologne: Rheinland-Verlag.

HaWb: *Hamburgisches Wörterbuch*. Kuhn, Hans & Ulrich Pretzel (eds.), 1956–2006. 5 volumes. Neumünster: Karl Wachholtz.

KWb: *Das Kölsche Wörterbuch. Kölsche Wörter von A-Z*. Bhatt, Christa & Alice Herrwegen. 2005. Cologne: Verlag J. P. Bachem.

MiElWb: *Mittelelbisches Wörterbuch*. Kettmann, Gerhard (ed.), 2002–2008. 2 volumes. Berlin: Akademie Verlag.

NKSS: *Neuer Kölnischer Sprachschatz*. 1956. Wrede, Adam. 3 volumes. Cologne: Greven.

NSSS: *Neunkirchen-Seelscheider Sprachschatz*. 2013. Zweite Auflage. Lammert, Leo & Paul Schmidt. Neunkirchen-Seelscheid: Heimat und Geschichtsverein Neunkirchen-Seelscheid e.V.

ObersWb: *Wörterbuch der obersächsischen und erzgebirgischen Mundarten*. Müller-Fraureuth, Karl. 1914. 2 volumes. Dresden: Wilhelm Baensch.

PWb: *Pommersches Wörterbuch*. Herrmann-Winter, Renate & Matthias Vollmer. 2007. Berlin: Akademie Verlag.

RWb: *Rheinisches Wörterbuch*. Müller, Josef (ed.), 1928–1971. 9 volumes. Bonn: Fritz Klopp Verlag.

SbWb: *Saarbrücker Wörterbuch*. Braun, Edith & Max Mangold. 1984. Saarbrücken: Saabrücker Druckerei und Verlag.

SchlHWb: *Schleswig-Holsteinisches Wörterbuch.* (Volksausgabe). Mensing, Otto. 1927–1935, 5 volumes. Neumünster: Karl Wachholtz.

SchwWb: *Schwäbisches Wörterbuch.* Auf Grund der von Adelbert v. Keller begonnenen Sammlungen und mit Unterstützung des württembergischen Staates. Bearbeitet von Fischer, Hermann. 1904–1936. 6 Volumes. Tübingen: H. Laupp'schen Buchhandlung.

SHesWb: *Südhessisches Wörterbuch.* Begründet von Friedrich Maurer nach den Vorarbeiten von Friedrich Mauer, Friedrich Stroh und Rudolf Mulch. Bearbeitet von Rudolf Mulch. 1965–2010. 6 volumes. Marburg: N.G. Elwert.

SiWS: *Simmentaler Wortschatz. Wörterbuch der Mundart des Simmentals (Berner Oberland). Mit einer grammatischen Einleitung und mit Registern.* Armin Bratschi und Rudolf Trüb unter Mitarbeit von Lily Trüb sowie Maria Bratschi und Ernst Max Perren. Zeichnungen von Rolf Oberhänsli. Thun: Ott Verlag.

TeWb: *Wörterbuch der Teltower Volkssprache.* (*Telschet Wöderbuek*). Lademann, Willy. 1956. Berlin: Akademie-Verlag.

TiWb: *Wörterbuch der Tiroler Mundarten.* Schatz, Josef. 1955. 2 volumes. Innsbruck: Universitätsverlag Wagner.

TrWb: *Trierer Wörterbuch. Mit Sprachgesetzen derselben und Sprachproben in Prosa und Poesie.* Christa, Peter. 1927/1969. Wiesbaden: Dr. Martin Sandig.

WbKM: *Wörterbuch der Kölner Mundart.* Hönig, Fritz. 1952. Cologne: Verlag J. P. Bachem.

WbMD: *Wörterbuch der Mundart von Dobschau.* Lux, Julius. 1961. Marburg: N.G. Elwert.

WbUS: *Wörterbuch der unteren Sieg*. Fischer, Helmut. 1985. Cologne: Rheinland Verlag.

WMlWb: *Wörterbuch der westmünsterländischen Mundart.* Piirainen, Elisabeth & Wilhelm Elling. 1992. Vreden: Heimatverein Vreden

WphWb: *Wörterbuch der westphälischen Mundart.* Woeste, Friedrich. 1882. Norden: Heinrich Soltau.

Appendix L: List of linguistic atlases

AADG: *Atlas zur Aussprache des deutschen Gebrauchsstandards.* Kleiner, Stefan. 2011. Unter Mitarbeit von Ralf Knöbl. Available at: http://prowiki.ids-mannheim.de/bin/view/AADG

AAS: *Atlas zur Aussprache des Schriftdeutschen in der Bundesrepublik Deutschland.* König, Werner. 1989. 2 volumes. Ismaning: Hueber Verlag

ACeM: *Atlas der Celler Mundart. Im Blickfelde der niedersächsischen Dialekte und deren Grenzgebiete.* Mehlem, Richard. 1967. Marburg: N.G. Elwert.

ADA: *Atlas zur deutschen Alltagssprache.* Elspaß, Stephan & Robert Möller, 2003. Available at: https://www.atlas-alltagssprache.de

ALA: *Atlas linguistique et ethnographique de l'Alsace.* Beyer, Ernest & Raymond Matzen. 1969–1984. 2 volumes. Paris: Centre National de la Recherche Scientifique.

ALLG: *Atlas linguistique et ethnographique de la Lorraine germanophone.* Philipp, Marte, Arlette Bothorel, & Guy Levieuge. 1977. Volume 1. Corps humain, maladies, animaux domestique. Paris: Centre National de la Recherche Scientifique.

KDSA: *Kleiner Deutscher Sprachatlas.* Dialektologisch bearbeitet von Werner H. Veith. Computativ bearbeitet von Wolfgang Putschke. Unter Mitarbeit von Lutz Hummel. 1984–1999. 4 volumes. Tübingen: Maz Niemeyer.

LATG: *Linguistic Atlas of Texas German.* Gilbert, Glenn G. 1972. Austin, TX: University of Texas Press.

LSA: *Luxemburgischer Sprachatlas. Laut- und Formenatlas.* Schmitt, Ludwig Erich (ed.). 1963. Marburg: N. G. Elwert.

MRhSA: *Mittelrheinischer Sprachatlas.* Bellmann, Günter, Joachim Herrgen & Jürgen Erich Schmidt. 1994–2002. 4 volumes. Tübingen: Max Niemeyer.

NOSA: *Norddeutscher Sprachatlas.* Elmentaler, Michael & Peter Rosenberg. 2015. Band 1 Regiolektale Sprachlagen. Hildesheim: Georg Olms.

SchlSA: *Schlesischer Sprachatlas.* Schmitt, Ludwig Erich (ed.) 1965–1967. 2 volumes. Marburg: N.G. Elwert.

SDA: *Sudetendeutscher Atlas.* Meynen, E. (ed.) 1954. Unter Mitarbeit von E. Bachmann, A. Hammerschmidt, K. Oberdorffer, H. Raschhofer, E. Schwarz, W. Weizsäcker. 1 volume. Munich: Verlag der Arbeitsgemeinschaft zur Wahrung sudetendeutscher Interessen.

SDSA: *Siebenbürgisch-Deutscher Sprachatlas.* Klein, Karl Kurt and Ludwig Erich Schmitt (ed.) 1961–1964. Auf Grund der Vorarbeiten von Richard Huss und Robert Csallner bearbeitet von Kurt Rein. 2 volumes. Marburg: N. G. Elwert.

SDS: *Sprachatlas der deutschen Schweiz.* Hotzenköcherle, Rudolf (ed.) 1962–1997. 8 volumes. Bern: Francke.

SBS: *Bayerischer Sprachatlas. Regionalteil 1. Sprachatlas von Bayerisch-Schwaben.* König, Werner & Hans Wellmann (eds.) 1996–2009. 14 volumes. Heidelberg: Universitätsverlag Winter.

SMF: *Bayerischer Sprachatlas. Regionalteil 2. Sprachatlas von Mittelfranken.* Munske, Horst Haider & Alfred Klepsch (eds.) 2003–2013. 8 volumes. Heidelberg: Universitätsverlag Winter.

SUF: *Bayerischer Sprachatlas. Regionalteil 3. Sprachatlas von Unterfranken.* Im Zusammenhang mit dem Bezirk Unterfranken. Wolf, Norbert Richard & Sabine Krämer-Neubert (eds.) 2005–2009. 6 volumes. Heidelberg: Universitätsverlag Winter.

SNOB: *Bayerischer Sprachatlas. Regionalteil 4. Sprachatlas von Nordostbayern.* Hinderling, Robert (ed.) 2004. 1 volume. Heidelberg: Universitätsverlag Winter.

SNiB: *Bayerischer Sprachatlas. Regionalteil 5. Sprachatlas von Niederbayern.* Eroms, Hans-Werner (ed.) 2003–2008. 7 volumes. Heidelberg: Universitätsverlag Winter.

SOB: *Bayerischer Sprachatlas. Regionalteil 6. Sprachatlas von Oberbayern.* Eichinger, Ludwig M. (ed.) 2008–2001. 6 volumes. Heidelberg: Universitätsverlag Winter.

SAO: *Sprachatlas von Oberösterreich*. Adalbert-Stifter-Institut des Landes Oberösterreich (eds.) 1998–2005. 3 volumes. Linz: Adalbert-Stifter-Institut des Landes Oberösterreich.

SNBW: *Sprachatlas von Nord Baden-Württemberg*. Klausmann, Hubert, Rudolf Bühler & Andreas Ganzmüller (eds.) 2015–2019. 5 volumes. Tübingen: Universitätsbibliothek Tübingen.

SSA: *Südwestdeutscher Sprachatlas*. Steger, Hugo, Eugen Gabriel & Volker Schupp (eds.) 1989–2011. 4 volumes. Marburg: N.G. Elwert.

ThürDA: *Thüringischer Dialektatlas*. Begründet und bearbeitet von Herman Hucke. 1961, 1965. 2 volumes. Berlin: Akademie-Verlag.

TSA: *Tirolischer Sprachatlas*. Klein, Karl Kurt & Ludwig Erich Schmitt (eds.) 1965–1971. 3 volumes. Marburg: N.G. Elwert.

VALTS: *Vorarlberger Sprachatlas. Mit Einschluss des Fürstentums Liechtenstein, Westtirols und des Algäus*. Gabriel, Eugen (ed.) 1985–2006. 5 volumes. Bregenz: Vorarlberger Landesbibliothek.

WDU: *Wortatlas der deutschen Umgangssprachen*. Eichhoff, Jürgen. 1977–2000. 4 volumes. Munich: Francke.

WSAH: *Wortgeographie der städtischen Alltagssprache in Hessen*. Friebertshäuser, Hans & Heinrich J. Dingeldein. 1988. Tübingen: Francke.

ZFSA: *Zimbrischer und fersentalerischer Sprachatlas/Atlante linguistico cimbro e mòcheno*. Schweizer, Bruno. Herausgegeben und kommentiert von/edizione curata e commentata da Stefan Rabanus. 2012. Lusern: Istituto Cimbro/Palai: Istituto Culturale Mòcheno.

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Velar fronting in German dialects

Velar Fronting (VF) is the name for any synchronic or diachronic phonological process shifting the velar place of articulation to the palatal region of the vocal tract. A well-known case of VF in Standard German is the rule specifying that the fricative [x] assimilates to [ç] after front segments. VF also refers to the change from velar sounds like [ɣ k g ŋ] to palatals ([ʝ c ɟ ɲ]). The book provides a thorough investigation of VF in German dialects: Data are drawn from over 300 original sources for varieties that are (or were) spoken in Germany, Austria, Switzerland, and other countries.

VF differs geographically along three parameters: (A) triggers, (B) targets, and (C) outputs. VF triggers (=A) are typically defined according to vowel height: In some systems VF is induced only by high front vowels, in others by high and mid front vowels, and in yet others by high, mid, and low front vowels. Some varieties treat consonants ([r l n]) as triggers, while others do not. VF can be nonassimilatory, in which case the rule applies even in the context of back segments. In many varieties of German, VF targets (=B) consist of the two fricatives [x ɣ], but in other dialects the targets comprise [x] but not [ɣ]. In some places, VF affects not only [x ɣ], but also velar stops and the velar nasal. The output of VF (=C) is typically palatal [ç] (given the input [x]), but in many other places it is the alveolopalatal [ɕ].

A major theme is the way in which VF interacts with synchronic and diachronic changes creating or eliminating structures which can potentially undergo it or trigger it. In many dialects the relationship between velars ([x]) and palatals ([ç]) is transparent because velars only occur in the back vowel context and palatals only when adjacent to front sounds. In that type of system, independent processes can either feed VF (by creating additional structures which the latter can undergo), or they can bleed it (by eliminating potential structures to which VF could apply).

In other dialects, VF is opaque. In one opaque system, both velars ([x]) and palatals ([ç]) surface in the context of front segments. Thus, in addition to expected front vowel plus palatal sequences ([…iç…]), there are also unexpected ones consisting of front vowel plus velar ([…ix…]). In a second type of opaque system, velars and palatals are found in the context of back segments; hence, expected sequences such as […iç…] occur in addition to unexpected ones like […ɑç…].

